

THE AUSTRALIAN  
**Entomologist**

*published by*  
THE ENTOMOLOGICAL SOCIETY OF QUEENSLAND



Volume 38, Part 3, 5 September 2011

Price: \$8.00 per part

ISSN 1320 6133



## THE AUSTRALIAN ENTOMOLOGIST

ABN#: 15 875 103 670

The Australian Entomologist is a non-profit journal published in four parts annually by the Entomological Society of Queensland and is devoted to entomology of the Australian Region, including New Zealand, Papua New Guinea and islands of the south-western Pacific. Articles are accepted from amateur and professional entomologists. The journal is produced independently and subscription to the journal is not included with membership of the society.

### The Publications Committee

Editor:	Dr D.L. Hancock	Editorial Co-ordinator
Assistant Editors:	Dr C.J. Burwell	Dr F. Turco
	Queensland Museum	Business Manager
	Dr F. Turco	Dr G.B. Monteith
	Queensland Museum	(geoff.monteith@bigpond.com)

### Subscriptions

Subscriptions are payable in advance to the Business Manager, The Australian Entomologist, P.O. Box 537, Indooroopilly, Qld, Australia, 4068.

For individuals:	A\$33.00 per annum in Australia.
	A\$40.00 per annum in Asia-Pacific Region.
	A\$45.00 per annum elsewhere.
For institutions	A\$37.00 per annum in Australia.
	A\$45.00 per annum in Asia-Pacific Region.
	A\$50.00 per annum elsewhere.

**Please forward all overseas cheques/bank drafts in Australian currency.**

GST is not payable on our publication.

### ENTOMOLOGICAL SOCIETY OF QUEENSLAND

Membership is open to anyone interested in Entomology. Meetings are normally held at the Ecosciences Precinct, Dutton Park, at 1.00pm on the second Monday of March-June and August-December each year. Meetings are announced in the Society's News Bulletin which also contains reports of meetings, entomological notes, notices of other Society events and information on Members' activities.

Enquiries relating to the Society should be sent to the Honorary Secretary, Entomological Society of Queensland, P.O. Box 537, Indooroopilly, Qld, 4068.

**Cover:** A male of *Canungratmictis morindana* Brailovsky 2002 (Heteroptera: Coreidae). This large (25-30mm) coreid bug is spectacular in appearance but extremely cryptic in the field. Adults hang ventral side upwards among foliage of its food plant, the twining vine *Morinda jasminoides* (RUBIACEAE). It was known from a single old specimen labelled "northern NSW" in the British Museum until the 1980s when discovery of its food plant allowed it to be reliably collected and described. It is now known to occur from Taree to Brisbane with an isolated population at Carnarvon Gorge.

Illustration by Geoff Thompson, Queensland Museum.



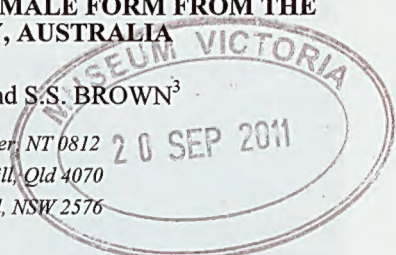
# NOTES ON THE BIOLOGY OF *OGYRIS ZOSINE* (HEWITSON, 1853) (LEPIDOPTERA: LYCAENIDAE: THECLINAE), INCLUDING THE FIRST RECORD OF THE PURPLE FEMALE FORM FROM THE NORTHERN TERRITORY, AUSTRALIA

R.P. WEIR<sup>1</sup>, C.E. MEYER<sup>2</sup> and S.S. BROWN<sup>3</sup>

<sup>1</sup>1 Longwood Avenue, Leanyer, NT 0812

<sup>2</sup>29 Silky Oak Avenue, Moggill, Qld 4070

<sup>3</sup>19 Kimberley Drive, Bowral, NSW 2576



## Abstract

The purple female form of *Ogyris zosine zosine* (Hewitson, 1853) is recorded from the Northern Territory, Australia for the first time. *Amyema benthamii* (Blakely) (Loranthaceae) is recorded as a new larval food plant and a member of the *Iridomyrmex pallidus* group (Formicidae: Dolichoderinae) is recorded as an alternative attendant ant to sugar ants belonging to the *Camponotus novaehollandiae* group (Formicinae) in the Northern Territory.

## Introduction

In Australia, *Ogyris zosine zosine* (Hewitson, 1853) is restricted to Northern Australia, occurring sporadically from North West Cape, Western Australia, through the Northern Territory (NT) and Queensland to Ballina and Evans Head in New South Wales (Braby 2000). Braby (2000) noted that *O. z. zosine* is chiefly found in savannah and open woodland but can also be found in a variety of coastal habitats, including open eucalypt forest and heath woodland. Braby (2000) also noted that populations of the butterfly are localised and restricted to areas where suitable combinations of larval food plant and attendant ant occur.

In the 'Top End' of the NT, the larval food plants include *Amyema miquelii* (Lehm. ex Miq.) Tiegh. (Loranthaceae) growing on *Eucalyptus* and, in suburban Darwin, *Decaisnina signata* (F. Muell. ex Benth.) Tiegh. (Loranthaceae). Colonies of the butterfly are normally attended by numerous sugar ants, *Camponotus* sp. (Formicinae). Until recently, sugar ants belonging to the *Camponotus novaehollandiae* group (Formicinae) were the attendant ant present at colonies of the butterfly encountered by the authors in the NT. Waterhouse (1932) also recorded a small black ant attending the butterfly, based on comments made by F.P. Dodd (Eastwood and Fraser 1999).

Braby (2000) noted that in dry inland areas, such as the NT, only blue female forms of the butterfly are found and that the colour is extensive. Braby (2000) also noted that, in the intermediate coastal and sub-coastal localities of northern and central Queensland, the female form could range from purple to blue, with a predominance of the purple form occurring in the wetter coastal areas. Previously, no purple female form of this butterfly has been recorded from the NT.

## Discussion

The authors have encountered colonies of the butterfly in the NT breeding on *Amyema miquelii* growing on *Eucalyptus* from Cullen River near Pine Creek and at Manton Dam Reserve, approximately 200 km and 45 km south of Darwin respectively. Recently, a colony of the butterfly was discovered in open eucalypt woodland occurring on the top of a sandstone escarpment approximately 15 km SSW of the Adelaide River township, 100 km south of Darwin. The larval food plant was identified as *Amyema benthamii* (Blakely) (Loranthaceae), a new food plant record for this butterfly.

In June 2003, another colony of the butterfly was encountered in suburban coastal Darwin, breeding on *Decaisnina signata* growing on the Northern Milkwood *Alstonia actinophylla* (Apocynaceae) and attended by sugar ants belonging to the *Camponotus novaehollandiae* group (Formicinae).

Over a period of months, numerous small brown ants were observed systematically driving the *Camponotus* ants from the butterfly colony until the *Camponotus* ants completely disappeared from the area. The authors thought that this was the end of the colony as the new, as yet unidentified ants were extremely aggressive when disturbed from under the cardboard collars placed on the trees. To our surprise, on removing the collars the new ant, belonging to the *Iridomyrmex pallidus* group (Dolichoderinae), was observed attending the butterfly larvae. While no palpation of the dorsal nectary organ was observed, the larvae were presenting droplets of fluid to the *Iridomyrmex* ants. When disturbed, the ants swarmed over the larvae, cardboard collar and our hands, attacking foreign objects vigorously. This is a new attendant ant record for the butterfly from Australia and may explain Dodd's personal comments to Waterhouse, as he collected extensively in Darwin in 1908 and 1909.

Observations were made during daylight hours and the *Iridomyrmex* ants were not observed herding the larvae towards the mistletoe. Also, the *Iridomyrmex* ants are only 3-4 mm in length compared with that of the *Camponotus* ants (15 mm in length) and their ability to physically herd the large *O. z. zosine* larvae would be questionable. However, there were broad, clearly defined trails of ants from the cardboard collars to the various clumps of mistletoe on the host trees and the larvae would have had no trouble negotiating their way to and from the mistletoe.

The butterfly colony continued to prosper in 2003, with between 50 and 100 larvae sheltering under the 17 cardboard collars that had been placed on four trees in an area covering approximately 60 m<sup>2</sup>. The larvae were left to develop on the trees and pupae were systematically collected between February and December 2003. During this period, 39 pupae were collected and reared to adult (Fig. 1), with thirteen pupae being reared in Canberra. The thirteen pupae reared in Canberra (by CEM) produced six males and seven



females, one of which was a purple form of the female previously unknown from the NT. The remaining pupae, reared in Darwin, yielded 15 males and 11 females, four of which were the purple female form.



Fig. 1. *Ogyris zosine zosine* (Hewitson): female colour forms from Darwin, NT.

Although pupae were collected regularly over the year, the purple female form did not appear until December. December in Darwin is typically when the wet season begins and the average daily humidity levels are between 65-75%; this may be a factor influencing the appearance of purple females close

to the coast. As humidity levels continued to rise and rainfall increased, the colony of *Iridomyrmex pallidus* contracted to the bases of trees in the area and the colony of *O. z. zosine* dwindled to a few individuals, none of which produced further purple female forms.

A review of the female *O. z. zosine* specimens from the NT held in the Australian National Insect Collection, Canberra (ANIC) revealed a further two purple forms. Their label data were: Elliot, NT, 16 Oct 1969, J.C. LeSoeuf, EP, ANIC Database No. 31 022824, (deformed purple female set as underside) and Elliot, NT, 12 Oct 1969, J.C. LeSoeuf, EP, ANIC Database No. 31 022822, (purple female set as upperside). These two purple females must have been overlooked by Braby (2000) during his review of the species.

Based on our experience, it would appear that the purple form of the female of *O. z. zosine* in the NT is less likely to be encountered than the blue form, a reversal of what occurs in the wetter areas of coastal northern Queensland.

### Acknowledgements

The authors would like to thank Ian Cowie (NT Herbarium) for plant identification, Haidee Brown (Dept. of Resources, Northern Territory Government), Dr Alan Anderson (CSIRO, Darwin) for the ant identification, and Ted Edwards (ANIC) for access to specimens under his care.

### References

- BRABY, M.F. 2000. *Butterflies of Australia: their identification, biology and distribution*. CSIRO Publishing, Melbourne; xxvii + 976 pp.
- EASTWOOD, R. and FRASER, A.M. 1999. Associations between lycaenid butterflies and ants in Australia. *Australian Journal of Ecology* 24: 503-537.
- HEWITSON, W.C. 1853. *Illustrations of new species of exotic butterflies selected chiefly from the collections of W. Wilson Saunders and William C. Hewitson. (1851-1856)*. Vols 1-5. London.
- WATERHOUSE, G.A. 1932. *What butterfly is that?* Angus and Robertson, Sydney; 291 pp, 32 pls.



## NOTES ON THE CORRECT SPELLING OF SPECIES-GROUP NAMES OF AUSTRALIAN BUTTERFLIES (LEPIDOPTERA)

ALBERT ORR<sup>1</sup> and HEINRICH FLIEDNER<sup>2</sup>

<sup>1</sup>*Griffith School of the Environment, Griffith University, Nathan, Qld 4111*

<sup>2</sup>*Louis-Seegelken-Straße 106, D 28717 Bremen, Germany*

### Abstract

For the last 15 years, publications on Australian butterflies have most often used species-group names with their original spelling, regardless of generic placement, sometimes violating the requirements of the International Code of Zoological Nomenclature. Recently, two new checklists of Australian butterflies have been published in which gender agreement requirements are observed. In these, there are 17 cases of disagreement between the lists and/or between the designations of earlier workers. This paper seeks to resolve these differences.

### Introduction

Since 1926, the International Code of Zoological Nomenclature has required that, subject to certain conditions, adjectival species-group names should agree in gender with the genus in which they are placed or recombined. This can affect the way in which the ending of a species-group name is formed. These requirements are retained in the current 4th edition of the code (ICZN 1999). The interpretation of these rules is not always simple. Many generic names are often made up by their authors, using a mixture of classical Latin and Greek, as well as words from other sources. The gender then must be decided from the form of the word and other clues, such as how it was intended for use by the author. Similarly, many species-group names are various forms of nouns, either in the nominative case in apposition or in the genitive case (as with eponyms). Many proper names are used in apposition. In species and subspecies names the endings of nouns never change, regardless of the gender of the genus in which they are placed. Similarly, adjectives directly transliterated from Greek or other languages and not latinized retain their original spelling.

The first publication attempting to regulate Australian butterfly names according to gender agreement requirements was by Common and Waterhouse (1981). Subsequent books and checklists of Australian Lepidoptera (Nielsen *et al.* 1996, Braby 2000, Edwards *et al.* 2001, Braby 2004) have used the original spelling of all species-group names and thus in many cases species-group names used in these publications were incorrect under the strict requirements of the code.

Recently, Orr and Kitching (2010) and Braby (2010) independently published checklists of Australian butterflies in which gender agreement was observed. Orr and Kitching in general followed Common and Waterhouse (1981) but several of the names used in these three works did not agree. This paper examines these discrepancies and attempts to resolve, in each case, which of the alternative spellings given is correct. It is very much in the interest of nomenclatorial stability that there should be a consensus in these cases.

Braby (2010) also listed numerous synonyms. However, this paper does not consider the gender of these, as we consider this to be the task of the subsequent reviser, should any of these be reinstated as species-group names.

In the following, we write original Greek words in Roman transliteration with the following conventions:  $\bar{\epsilon}$  denotes  $\eta$  (eta);  $\bar{\omega}$  denotes  $\omega$  (omega); aspirated initial vowels (rough breathing) are preceded by 'h'; accented syllables are underlined. This will enable readers familiar with Greek to follow the original orthography.

### Names in dispute

The following names are listed as they appeared originally and as used subsequently by Common and Waterhouse (1981), Orr and Kitching (2010) and Braby (2010). All names are listed in chronological order of publication. Common and Waterhouse's bracket placement is modernised for conformity.

#### 1

Original combination: *Goniloba discolor* C. & R. Felder, 1859.

Common and Waterhouse 1981: *Hasora discolor* (C. & R. Felder, 1859).

Orr and Kitching 2010: *Hasora discolor* (C. & R. Felder, 1859).

Braby 2010: *Hasora discolora* (C. & R. Felder, 1859).

The adjective *discolor*, meaning 'of different colours', can be masculine, feminine or neuter. Although the forms *discolorus*, *-a*, *-um* did exist in late antiquity (used by writers such as Apuleius and Prudentius), this was not the form of the adjective chosen by the authors, who clearly intended it to be feminine.

Correct name: *Hasora discolor* (C. & R. Felder, 1859).

#### 2

Original combination: *Trapezites heteromacula* Meyrick & Lower, 1902.

Common and Waterhouse 1981: *Trapezites heteromacula* Meyrick & Lower, 1902.

Orr and Kitching 2010: *Trapezites heteromacula* Meyrick & Lower, 1902.

Braby 2010: *Trapezites heteromaculatus* Meyrick & Lower, 1902.

In this case the name ends with the Latin *macula*, a feminine noun, meaning 'a spot'. The addition of the Greek *hetero* to form *heteromacula*, meaning 'a different spot,' makes this name a neologism; *i.e.* it never existed in antiquity. However, as in Indo-European languages the last element determines the gender of a compound, it retains the structure of a feminine noun and as the authors combined it with the masculine genus *Trapezites* it seems clear they intended it as a noun. There is no justification for recasting it as an adjective (*heteromaculatus*).

Correct name: *Trapezites heteromacula* Meyrick & Lower, 1902.



### 3

Original combination: *Papilio polydorus queenslandicus* Rothschild, 1895.

Common and Waterhouse 1981: *Pachliopta polydorus queenslandicus* (Rothschild, 1895).

Orr and Kitching 2010: not listed.

Braby 2010: *Pachliopta polydorus queenslandica* (Rothschild, 1895).

The genus *Pachliopta* Reakirt, 1865, is a neologism constructed from Greek elements, thus its gender must be established by convention, no gender being specified by the author. The type species was *diphilus* Esper, 1793, a masculine proper noun and a synonym of *aristolochiae* Fabricius, 1775. Braby (2010) stated that the genus is feminine. This would appear to be justified under Article 30.2.4; 'If no gender was specified or indicated, the name is to be treated as masculine, except that, if the name ends in *-a* the gender is feminine, and if it ends in *-um*, *-on*, or *-u* the gender is neuter'. Moreover conventional usage by other authors also favours this view. The meaning of *Pachliopta* was intended to be '(larva) having the appearance of a thick chilopod' (Reakirt 1865).

Correct name: *Pachliopta polydorus queenslandica* (Rothschild, 1895).

### 4

Original combination: *Papilio arctous* Fabricius, 1775.

Common and Waterhouse 1981: *Xois arctoa* (Fabricius, 1775).

Orr and Kitching 2010: *Ypthima arctoa* (Fabricius, 1775).

Braby 2010: *Ypthima arctous* (Fabricius, 1775).

The generic name *Ypthima* appears to have no meaning in antiquity, but its form and normal usage suggest it is feminine, as stated by Braby (2010). *Xois* is also feminine. The specific name *arctoa* is clearly an adjective, meaning 'pertaining to the north star', and declines as *-us*, *-a*, *um* for masculine, feminine and neuter forms respectively.

Correct name: *Ypthima arctoa* (Fabricius, 1775).

### 5

Original combination: *Thecla aurifer* Blanchard, 1848.

Common and Waterhouse 1981: *Paralucia aurifera* (Blanchard, 1848).

Orr and Kitching 2010: *Paralucia aurifer* (Blanchard, 1848).

Braby 2010: *Paralucia aurifera* (Blanchard, 1848).

The specific name *aurifer* is an adjective meaning 'gold-bearing'. Its normal feminine form is *aurifera*. That Blanchard failed to use this form with a feminine genus (*Thecla*) may have been a *lapsus*, as was the usage of Orr and Kitching (2010).

Correct name: *Paralucia aurifera* (Blanchard, 1848).

## 6

Original combination: *Lycaena ignita* Leach, 1814.

Common and Waterhouse 1981: *Hypochrysops ignitus* (Leach, 1814).

Orr and Kitching 2010: *Hypochrysops ignitus* (Leach, 1814).

Braby 2010: *Hypochrysops ignita* (Leach, 1814).

*Hypochrysops* C. & R. Felder, 1860 is masculine under Article 30.1.4.3. (ICZN 1999): 'A compound genus-group name ending in *-ops* is to be treated as masculine, regardless of its derivation or of its treatment by its author'. Braby (2010) also considers it masculine. Therefore *ignitus*, *-a*, *-um*, an adjective meaning 'fervent' or 'glowing' derived from the masculine noun *ignis*, meaning 'fire', must be declined and the masculine *-us* ending applied.

Correct name: *Hypochrysops ignitus* (Leach, 1814).

## 7

Original combination: *Miletus erythrina* Waterhouse & Lyell, 1909.

Common and Waterhouse 1981: *Hypochrysops ignitus erythrinus* (Waterhouse & Lyell, 1909).

Orr and Kitching 2010: *Hypochrysops ignitus erythrina* (Waterhouse & Lyell, 1909).

Braby 2010: *Hypochrysops ignita erythrina* (Waterhouse & Lyell, 1909).

There was no Greek adjective *erythrinus* or Latin *erythrinus* in antiquity and no noun *erythrina*, but it has been used in biological nomenclature since Linnaeus, generally to indicate red coloration. In any case, since Waterhouse and Lyell combined the name *erythrina* with the genus name *Miletus* it was surely intended as a noun.

Correct name: *Hypochrysops ignitus erythrina* (Waterhouse & Lyell, 1909).

## 8

Original combination: *Hypochrysops piceata* Kerr, Macqueen & Sands, 1969.

Common and Waterhouse 1981: *Hypochrysops piceatus* Kerr, Macqueen & Sands, 1969.

Orr and Kitching 2010: *Hypochrysops piceatus* Kerr, Macqueen & Sands, 1969.

Braby 2010: *Hypochrysops piceata* Kerr, Macqueen & Sands, 1969.

There is no correct classical Latin adjective *piceatus*, but there is a participle *picatus*, meaning 'besmirched with pitch' as well as the adjective *piceus*, 'black as pitch'. However since the 19th century the form *piceatus*, *-a*, *-um* has been used in nomenclature in animals and plants for blackish organisms. Accepting the gender of *Hypochrysops* C. & R. Felder, 1860 as masculine (see above), the specific name would also have to take the masculine ending.

Correct name: *Hypochrysops piceatus* Kerr, Macqueen & Sands, 1969.



# 9

Original combination: *Hypolycaena litoralis* Lambkin, Meyer, Brown & Weir, 2005.

Common and Waterhouse 1981: not listed.

Orr and Kitching 2010: *Hypolycaena litoralis* Lambkin, Meyer, Brown & Weir, 2005.

Braby 2010: *Hypolycaena littoralis* Lambkin, Meyer, Brown & Weir, 2005.

The spelling given by Braby (2010) appears to be an unwarranted correction or a typographic error. The original spelling *litoralis*, meaning 'of the shore', is correct Latin, but even had it been incorrect, it would stand as published.

Correct name: *Hypolycaena litoralis* Lambkin, Meyer, Brown & Weir, 2005.

# 10

Original combination: *Lycaena acasta* Cox, 1873.

Common and Waterhouse 1981: *Candalides acastus* (Cox, 1873).

Orr and Kitching 2010: *Candalides acastus* (Cox, 1873).

Braby 2010: *Candalides acasta* (Cox, 1873).

The genus *Candalides* is masculine. However *Acasta* is latinized from *Akastē*, the name of one of the numerous daughters of *Okeanos*, a central divinity of ancient Greek mythology, being a personification of the ocean surrounding the land and father of all rivers, streams, springs and wells. Therefore *acasta* is a proper noun and does not change.

Correct name: *Candalides acasta* (Cox, 1873).

# 11

Original combination: *Zizera delospila* Waterhouse 1903.

Common and Waterhouse 1981: *Zetona delospila* (Waterhouse, 1903).

Orr and Kitching 2010: *Candalides delospilus* (Waterhouse 1903).

Braby 2010: *Candalides delospila* (Waterhouse 1903).

*Candalides* is masculine as noted by Braby (2010). The compound *delospilus* is not of ancient origin, but its elements are Greek: the first part is the adjective *dēlos* - 'visible, conspicuous'; its principal part, *spilos* - 'a spot, fleck, or blemish', is a Greek masculine noun. That means that compounds with that as the final element would generally be nouns. However it is clear that when Waterhouse established this species as *delospila* in combination with the feminine genus *Zizera*, he intended the name to be feminine, i.e. an adjective derived from the Greek *spilos* (because a masculine noun normally could have no feminine form). This is not the correct way to form the adjective from the Greek noun (which would be based on the word *spilōtos*) but it is the intention of the author, rather than the philological correctness, which determines the interpretation. As Waterhouse clearly intended an adjective in latinized form it must be declined. The meaning of it is presumably 'clearly spotted'.

Correct name: *Candalides delospilus* (Waterhouse 1903).

## 12

Original combination: *Holochila heathi aerata* Montague, 1914.

Common and Waterhouse 1981: *Candalides heathi aeratus* (Montague, 1914).

Orr and Kitching 2010: not listed.

Braby 2010: *Candalides heathi aerata* (Montague, 1914).

*Candalides* is masculine as noted by Braby (2010); *aeratus* is a Latin adjective meaning 'bronze-plated' which must take the masculine ending.

Correct name: *Candalides heathi aeratus* (Montague, 1914).

## 13

Original combination: *Lycaena lineata* Murray, 1874.

Common and Waterhouse 1981: *Erysichton lineata* (Murray, 1874).

Orr and Kitching 2010: *Erysichton lineata* (Murray, 1874).

Braby 2010: *Erysichton lineatus* (Murray, 1874).

*Erysichton* is masculine as noted by Braby (2010); *lineatus* is a Latin adjective meaning 'lined' which must take the masculine ending.

Correct name: *Erysichton lineatus* (Murray, 1874).

## 14

Original combination: *Lycaena serpentata* Herrich-Schäffer, 1869.

Common and Waterhouse 1981: *Theclinesthes serpentata* (Herrich-Schäffer, 1869).

Orr and Kitching 2010: *Theclinesthes serpentata* (Herrich-Schäffer, 1869).

Braby 2010: *Theclinesthes serpentatus* (Herrich-Schäffer, 1869).

Braby (2010) lists the genus *Theclinesthes* Röber, 1891 as masculine without justification. Common and Waterhouse (1981) treat the genus as feminine. There was no clue as to the gender of the genus from the original description as the type species is *Plebius (Theclinesthes) eremicola* Röber, 1891. The species name *eremicola* is a noun, meaning 'desert-dweller', which can be either masculine or feminine. It might be argued that since this name was associated with the masculine genus-group name *Plebius*, *Theclinesthes* was also intended to be masculine. However, also of importance is the derivation of the word *Theclinesthes*. It is conjectured here that the name is composed of the name *Thecl(a)*, *-in(us)* - 'fitting to, belonging to' and *esthēs* f. - 'clothing', to describe a similarity to the genus *Thecla*. In this case *Theclinesthes* must be feminine. The fact that all declinable species-group names in the genus were originally placed in feminine genera also means that this interpretation least disrupts the original spellings. It is, however, a case which might require an application to the ICZN for a formal ruling. The specific name *serpentatus*, *-a*, *-um*, is an adjective, meaning 'marked with snakes', presumably a fanciful reference to the sinuous underside markings.

Correct name (provisional): *Theclinesthes serpentata* (Herrich-Schäffer, 1869).



## 15

Original combination: *Utica albocincta* Waterhouse, 1903.

Common and Waterhouse 1981: *Theclinessthes albocincta* (Waterhouse, 1903).

Orr and Kitching 2010: *Theclinessthes albocincta* (Waterhouse, 1903).

Braby 2010: *Theclinessthes albocinctus* (Waterhouse, 1903).

The specific name *albocinctus*, *-a*, *-um* is an adjective meaning 'white-girdled'. Using the same argument applied above, *albocincta* should be retained in feminine form.

Correct name (provisional): *Theclinessthes albocincta* (Waterhouse, 1903).

## 16

Original combination: *Catochrysops cyta* Boisduval, 1832.

Common and Waterhouse 1981: not listed.

Orr and Kitching 2010: *Jamides cytus* (Boisduval, 1832).

Braby 2010: *Jamides cyta* (Boisduval, 1832).

In his original description, Boisduval (1832) provided no clues as to the origin of the name *cyta*. As its derivation is obscure, it should be treated as a noun and its original spelling conserved. We note Parsons (1998) listed this species as *Jamides cytus* (Boisduval, 1832) but, as there was no explanation, we must assume this was an unjustified correction which must be rejected.

Correct name: *Jamides cyta* (Boisduval, 1832).

## 17

Original combination: *Danis nemophila* Butler, 1876.

Common and Waterhouse 1981: *Jamides nemophilus nemophilus* (Butler, 1876).

Orr and Kitching 2010: *Jamides nemophilus* (Butler, 1876).

Braby 2010: *Jamides nemophila* (Butler, 1876).

*Nemophila* is a modern compound of Greek elements. The Greek word *philos* can be an adjective as well as a noun. The same is true for the feminine *philē*. The ICZN Code states that if there is any doubt (and there is in this case) the word is to be treated as a noun, meaning 'lover of glades'.

Correct name: *Jamides nemophila* (Butler, 1876).

## Acknowledgements

We would like to express our gratitude to Dr Michael Braby and Mr John Nielsen for supplying literature. The manuscript benefited from discussions with Drs David Hancock, Roger Kitching and Jan van Tol. The suggestions of two anonymous referees were very helpful.

## References

- BOISDUVAL, J.B.A.D. de. 1832. *Voyage de découvertes de l'Astrolabe exécuté par ordre du Roi, pendant les années 1826-1827-1828-1829, sous le commandement de M.J. Dumont D'Urville. Faune entomologique de l'Océan Pacifique, avec l'illustration des insectes nouveaux recueillis pendant le voyage. Part I. Lépidoptères.* J Tastu, Paris; iv + 5-267 pp.
- BRABY, M.F. 2000. *Butterflies of Australia: their identification, biology and distribution.* 2 vols. CSIRO Publishing, Canberra; xxv + 976 pp.
- BRABY, M.F. 2004. *The complete field guide to the butterflies of Australia.* CSIRO Publishing, Canberra; x + 340 pp.
- BRABY, M.F. 2010. The merging of taxonomy and conservation biology: a synthesis of Australian butterfly systematics (Lepidoptera: Hesperioidea and Papilionoidea) for the 21<sup>st</sup> century. *Zootaxa* 2707: 1-76.
- COMMON, I.F.B. and WATERHOUSE, D.F. 1981. *Butterflies of Australia.* Revised edition. Angus & Robertson, Sydney; xiv + 682 pp.
- EDWARDS, E.D., NEWLAND, J. and REGAN, L. 2001. Lepidoptera, Hesperioidea, Papilionoidea. In: Wells, A. and Houston, W.W.K. (eds), *Zoological Catalogue of Australia.* Vol. 31.6. CSIRO Publishing, Melbourne; x + 615 pp.
- ICZN, 1999. *International Code of Zoological Nomenclature.* 4<sup>th</sup> edition. International Trust for Zoological Nomenclature, London, xxix + 126 pp.
- NIELSEN, E.S., EDWARDS, E.D. and RANGSI, T.V. 1996. *Checklist of the Lepidoptera of Australia. Monographs on Australian Lepidoptera.* Volume 4. CSIRO Publishing, Melbourne; xiv + 529 pp.
- ORR, A.G. and KITCHING, R.L. 2010. *The butterflies of Australia.* Allen & Unwin, Sydney; viii + 327 pp.
- PARSONS, M.J. 1998. *The butterflies of Papua New Guinea: their systematics and biology.* Academic Press, London; xvi + 736 pp.
- REAKIRT, T. 1865. Notes upon exotic Lepidoptera, chiefly from the Philippine Islands, with descriptions of some new species. *Proceedings of the Entomological Society of Philadelphia* 3: 443-504.



AN ANNOTATED KEY TO THE SPECIES OF  
*ACANTHONEVRA* MACQUART AND ALLIED GENERA  
(DIPTERA: TEPHRITIDAE: ACANTHONEVRINI)

DAVID L. HANCOCK

8/3 McPherson Close, Edge Hill, Cairns, Qld 4870

**Abstract**

Indo-Australian and East Asian fruit flies referred to the *Acanthonevra* complex of genera are reviewed and keyed. Recorded host plants are bamboos. The 49 recognised species are referred to nine genera: *Acanthonevra* Macquart (3 spp), *Chaetomerella* de Meijere (1 sp.), *Erectovena* Ito (2 spp), *Freyomyia* Hardy (3 spp), *Lenitovena* Ito (5 spp), *Ptilona* van der Wulp (8 spp), *Rioxoptilona* Hendel (17 spp), *Themara* Walker (9 spp) and *Yunacantha* Chen & Zia, stat. rev. (1 sp.). Three species (*Ptilona conformis* Zia, *Rioxoptilona ochroleura* (Hering) and *Themara yunnana* Zia) are removed from synonymy. Six new synonyms and 26 new combinations are proposed, including the transfer of *Freyomyia manto* (Osten Sacken) and *F. vinnula* (Hardy) from *Rioxa* Walker. The type locality for *Acanthonevra fuscipennis* Macquart (= *A. normaliceps* Enderlein, syn. n.) is regarded as Java, not Bengal. A note on *Phorelliosoma* Hendel (= *Staurellina* Hering, syn. n.; = *Orienticaelum* Ito, syn. n.) is included.

**Introduction**

Korneyev (1999) provisionally established the limits of the *Acanthonevra* group of genera and referred the included genera to two subgroups; he also noted that *Acanthonevra sens. lat.* appeared to be polyphyletic, with its component species divided between the *Acanthonevra* and *Ptilona* subgroups. My own studies support this view and suggest that the Indo-Australian genera *Acanthonevra* Macquart, *Chaetomerella* de Meijere, *Erectovena* Ito, *Lenitovena* Ito, *Ptilona* van der Wulp, *Rioxoptilona* Hendel and *Themara* Walker form a complex of closely allied genera. All have generally dark-patterned wings with hyaline or yellow indentations and discal spots and, in all but a few species, a quadrate or elongate hyaline or yellow indentation at the base of the stigma (costal part of cell sc) (Figs 1-2). I also include in this complex *Freyomyia* Hardy and *Yunacantha* Chen & Zia, with the latter removed from synonymy with *Acanthonevra*.

Korneyev (1999) also suggested a close relationship between the *Acanthonevra* complex and *Homoiothemara* Hardy, a monotypic genus from Sabah, East Malaysia; however it has a different type of wing pattern, broadly protuberant eyes in both sexes and spermathecae with apical projections and appears to belong in the *Sophira* complex of genera.

Norrbom *et al.* (1999) listed the species then included within the above genera and that list is essentially followed here. However, several taxa listed under *Acanthonevra sens. lat.* have been referred to other genera, viz. *Dirioxa incerta* (Hardy) from Indonesian West Papua (Hancock and Drew 2003), *Euphranta notabilis* (van der Wulp) from Sumatra (Hancock and Drew 2004) and *Orienticaelum parvisetalis* (Hering) from China (Wang 1998), while *Pseudacidia uncinata* Hering from central Burma is here removed from *Acanthonevra sens. lat.* and referred to the *Sophira* complex.

Biological information is scant. Several species of *Acanthonevra sens lat.* (*A. siamensis* Hardy, *Erectovena desperata* (Hering), *Rioxoptilona dunlopi* (van der Wulp), *R. gravelyi* (Munro), *R. hemileina* (Hering), *R. quatei* (Hardy) [as *A. ultima* Hering] and *R. vaga* (Wiedemann)) were collected resting beneath leaves of understorey plants in bamboo forests in Thailand (Hancock and Drew 1995a). One specimen of *Themara ampla* Walker and some two dozen of *T. hirtipes* (Rondani) were collected at cut bamboo shoots in Malaysia (Hancock and Drew 1994, D. Kovac and P. Dohm pers. comm.), suggesting an association with bamboo. Although several *T. hirtipes* and *T. hirsuta* (Perkins) were collected on the bark of felled trees in Sarawak (Perkins 1938), suggesting that this might be a likely host, specimens of *Sophira limbata* Enderlein [actually *S. l. borneensis* Hering] were also collected thus (Perkins 1938) and this might merely reflect an adult feeding site.

*Ptilona confinis* (Walker) and *P. conformis* Zia [as *P. persimilis* Hendel] were collected at cut bamboo shoots in Malaysia (Hancock and Drew 1994) and both bred from the internodes of dead bamboo culms (D. Kovac and P. Dohm pers. comm.). *Rioxoptilona dunlopi*, *R. ochroleura* (Hering) and *R. vaga* were collected at cut bamboo shoots and bred from decaying shoots in Thailand or Malaysia (Hancock and Drew 1994, 1995a), while *R. hemileina* also has been bred from dead bamboo shoots in Thailand (D. Kovac and P. Dohm pers. comm.). What appears to be *R. dunlopi* [as *Acanthonevra formosana* Enderlein] was bred from bamboo shoots, while *Ptilona persimilis* and *R. unicolor* (Shiraki) [as *R. speciosa* Hendel] were associated with bamboo in Taiwan (Yen *et al.* 1979). Identified host plants include *Bambusa vulgaris*, *Bambusa* sp. and *Dendrocalamus nudus* for *R. dunlopi* (Allwood *et al.* 1999), *Dendrocalamus giganteus* for *R. gravelyi* (Dohm *et al.* 2008), *Gigantochloa scortechinii* for *R. ochroleura* [as *Acanthonevra gravelyi*] (Dohm *et al.* 2008) and *Bambusa blumeana*, *Dendrocalamus pendulus* and *Gigantochloa scortechinii* for *R. vaga* (Permkam 2005, Dohm *et al.* 2008).

In order to aid identification of the nine genera and 49 species included in the *Acanthonevra* complex, an annotated key is provided below, updating the partial keys of Hardy (1973, 1974, 1986) and Wang (1998), wherein the taxa included here key to the genera *Acanthonevra*, *Ptilona*, *Themara*, *Freyomyia*, *Rioxa* [in part], *Sophira* [in part] and *Orienticaelum* [in part]. A major factor in the preparation of this key has been the examination of a series of syntypes of *Acanthonevra ultima* Hering in the Natural History Museum, London. Briefly described and with no published illustration (Hering 1941a), its identity has been a source of past confusion (*e.g.* Hancock and Drew 1995a).

### Key to genera and species

- 1 Wing with vein  $R_{2+3}$  strongly undulate, the apex curving evenly forwards to meet costa almost at right angles (Fig. 2); cell dm with subapical hyaline spots not formed into a transverse band; male fore femur and tibia not densely setose ventrally ..... *Acanthonevra* Macquart ... 2





Figs 1-3. *Acanthonevra fuscipennis* Macquart: wings of specimens from West Malaysia. (1) male; (2-3) females showing variation in costal cell pattern. Photographs by Scott Ginn (Australian Museum, Sydney).

- Wing with vein  $R_{2+3}$  not as above, if strongly undulate then straightening near apex to meet costa at an acute angle (Fig. 4); cell dm with subapical hyaline spots often formed into a transverse band ..... 4
  - 2 Wing cell c with two pale spots separated by a brown medial band, the distal spot sometimes diffuse in males [Trang Province of S Thailand, West Malaysia, Sumatra, Java, Kalimantan and Brunei (Chua 2000); the type locality 'Bengale' (India) is regarded as an error, the type female is almost certainly from Java and all other Indian records appear to belong to *Themara yunnana*; *Trypeta (Acanthoneura) polyxena* Osten Sacken, 1881, *A. batata* Enderlein, 1911, *A. normaliceps* Enderlein, 1911, **syn. n.** and *A. synopica* Hering, 1952 are regarded as synonyms; this is the type species of *Acanthoneura* (Figs 1-3, with Fig. 2 most resembling the type)] ..... *A. fuscipennis* Macquart, 1843
- [*A. fuscipennis* appears to be a very variable species: wing cell c with pale spots hyaline to yellowish and variable in size; wing apex broadly subhyaline to yellowish, often weakly so in males, with the extreme apex usually narrowly brown across apex of vein  $R_{4+5}$  and the pale area variably extending from just below apex of vein  $R_{2+3}$  to from mid way between veins  $R_{4+5}$  and M to tip of vein M; discal area usually with 2-3 large hyaline spots in cells br,  $r_{4+5}$  and dm, that in cell  $r_{4+5}$  above to just basad of DM-Cu crossvein, that in cell dm directly below or slightly to one side of R-M crossvein; spots in cell br and/or other cells often reduced or absent and with pattern often diffuse in males; cell m usually with a distinct hyaline indentation that is sometimes weak or absent; cell bcu mostly subhyaline or with subhyaline area reduced to a small spot, especially in males; costa and veins  $R_1$  and  $R_{4+5}$  with setae distinct and relatively long; the types of *normaliceps* (♂♂) and *batata* (♀♀) (c.f. Figs 1, 3) are from the same locality (Soekaranda) in NE Sumatra; *synopica* was separated largely on the basis of its yellowish costal cells and apical pale area extending only mid way between veins  $R_{4+5}$  and M (Hering 1952) but was synonymised by Hardy (1986) and this is accepted here.]
- Wing cell c broadly pale medially, not with two pale spots separated by a brown medial band ..... 3
  - 3 Wing apex broadly brown; discal area with 3 round hyaline spots in cells br,  $r_{4+5}$  and dm plus an additional spot at posterior apex of cell dm (at least in male) [S India; female unknown] ..... *A. inermis* Hering, 1951
  - Wing apex with a brownish area along vein  $R_{4+5}$  crossing the subhyaline area to costa, leaving a hyaline spot above it and a subhyaline one below [N Thailand] ..... *A. siamensis* Hardy, 1973
  - 4 Wing veins M normally and  $Cu_1$  including basal portion always setose above; males usually with head broadened or eyes distinctly stalked; vein  $R_{2+3}$  undulate, usually strongly so ..... *Themara* Walker ... 5



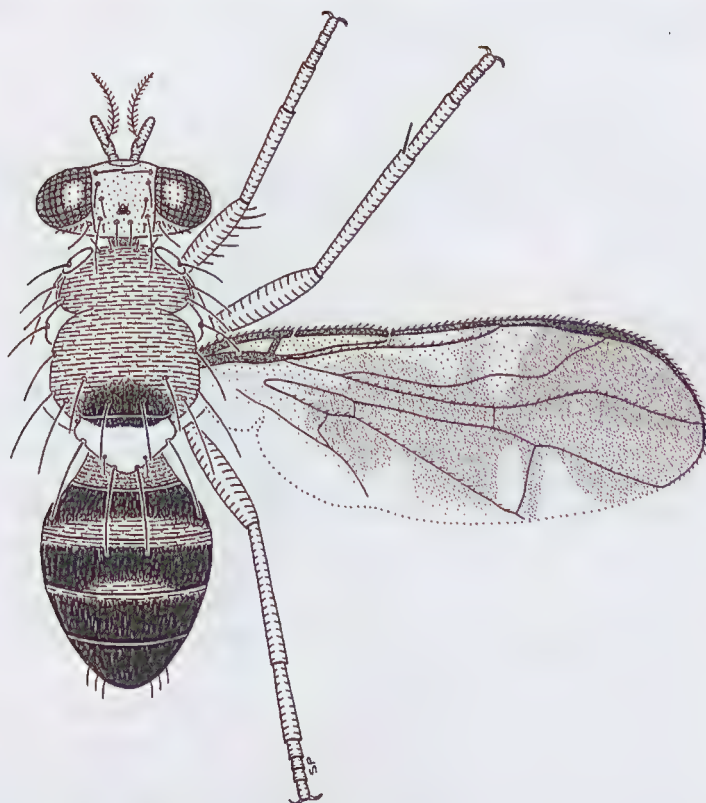


Fig. 4. *Themara ampla* Walker: male from West Malaysia.

- Wing veins M normally and  $Cu_1$  entirely bare; males with head usually narrow and eyes not stalked; vein  $R_{2+3}$  variable in shape ..... 13
- 5 Wing vein  $R_{2+3}$  weakly undulate; no pale indentations along costal margin but a hyaline spot in cell  $r_{2+3}$  above R-M crossvein; cell  $r_{4+5}$  with a large hyaline indentation filling most of cell [known only from Engano Island near Sumatra, Indonesia; male unknown] ..... *T. extraria* Hering, 1952
- Wing vein  $R_{2+3}$  distinctly undulate but straightening at apex to meet costa at an acute angle; costal margin with hyaline or yellowish indentations; cell  $r_{4+5}$  at most with a small hyaline spot or patch in central region ..... 6
- 6 Hyaline indentation in cell  $r_1$  broad, not crossing vein  $R_{2+3}$  and united with hyaline indentation in stigma; male with eyes moderately stalked [Sumatra and associated islands] ..... *T. jacobsoni* de Meijere, 1916

- Hyaline indentation in cell  $r_1$  narrow, crossing vein  $R_{2+3}$  and distinctly separated from hyaline indentation in stigma ..... 7
- 7 Apex of wing broadly subhyaline or yellowish ..... 8
- Apex of wing entirely dark brown ..... 9
- 8 Scutum fulvous, without dark longitudinal vittae; male with eyes distinctly stalked [Philippines (Luzon, Negros, Tawitawi); a record from Bougainville, Papua New Guinea (Hardy 1986) is doubtful and probably mislabelled] ..... *T. lunifera* Hering, 1938
- Scutum with 4 or 5 dark longitudinal vittae; male with head broad but eyes not stalked [Philippines (Mindanao); a female recorded from Cambodia (Hardy 1973, 1974) is likely to be *Freyomyia vimula* (Hardy); *T. ostensackeni* Hardy, 1974, **syn. n.** differs solely in the number of scutal vittae and is otherwise inseparable] ..... *T. alkestis* (Osten Sacken, 1882)
- 9 Pale indentation in stigma narrow and confined to base; pale basal areas hyaline; DM-Cu crossvein bare; male fore femur and tibia densely setose ventrally; male with eyes not stalked, the frons slightly longer than wide [Sarawak, Sabah and Brunei; *Acanthoneura hirsuta* var. *nigrifacies* Perkins, 1938 is regarded as a synonym] ..... *T. hirsuta* (Perkins, 1938)
- Pale indentation in stigma broad, filling most of cell and extending to or beyond vein  $R_{2+3}$ ; pale basal areas yellow; DM-Cu crossvein setose; male fore femur and tibia not densely setose ventrally ..... 10
- 10 Scutum with a black posterior patch but no dark longitudinal vittae; scutellum yellow with a narrow black basal band; hyaline spot in cell  $r_{4+5}$  small or absent; male with eyes not stalked, the frons a little broader than long, vein  $R_{2+3}$  strongly curved forwards apically and costa thickened [West Malaysia, Singapore, Sumatra, Sarawak, Sabah and Brunei; *T. microcephala* Hering, 1939 is regarded as a synonym; this is the type species of *Themara* (Fig. 4)] ..... *T. ampla* Walker, 1856
- Scutum with 4-5 dark longitudinal vittae; scutellum often laterally or entirely black; hyaline spot in cell  $r_{4+5}$  large and distinct; males with eyes often distinctly stalked ..... 11
- 11 Both sexes with vein  $R_{2+3}$  undulate but not strongly curved forwards apically and costa not distinctly thickened; scutum with medial vitta present or absent; fore coxae and prosternum pale; face with a narrow dark band confined to oral margin; male eyes often very strongly stalked [SE China (Hainan), Thailand, Laos, S Burma, Sumatra, Java, Singapore, West Malaysia, Sarawak (type locality), Sabah, Brunei and Palawan; *T. enderleini* Hering, 1938, *T. palawanica* Hering, 1938 and *T. maculipennis* of Hancock and Drew 1994 are regarded either as synonyms or a misidentification (Fig. 5)] ..... *T. hirtipes* Rondani, 1875



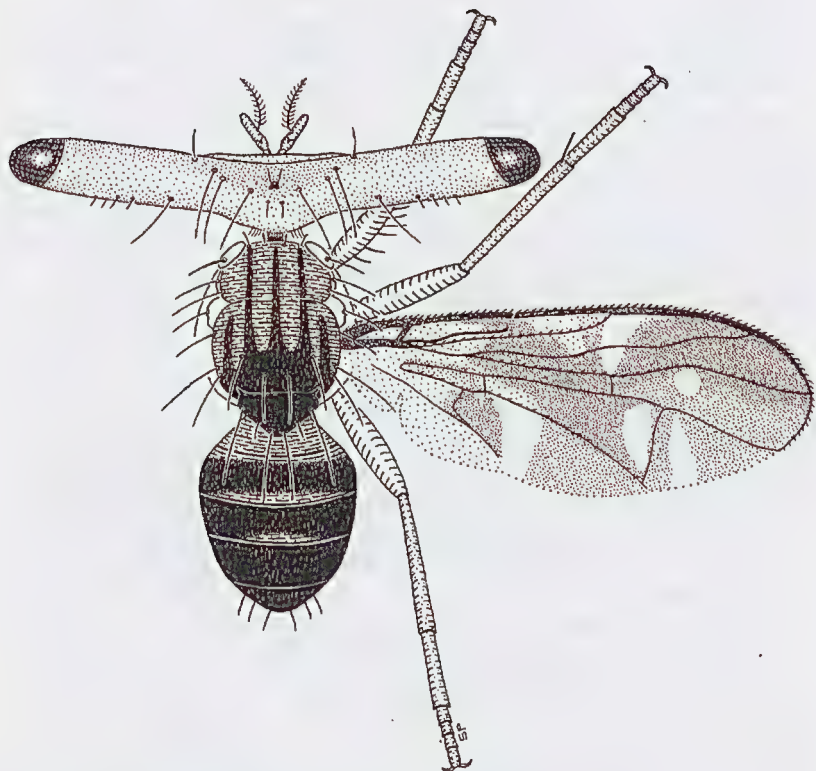


Fig. 5. *Themara hirtipes* Rondani: male from Sarawak.

- Male with vein  $R_{2+3}$  strongly curved forwards apically and costa often thickened; face either entirely pale or with the dark band reaching almost to antennae; male eyes not or less strongly stalked ..... 12
- 12 Scutum with 4 or 5 dark vittae and pale or dark posteriorly; face pale in female, darker in male; male eyes not stalked, frons about twice as wide as long [southern China (Yunnan) and India (Assam, Bengal, Karnataka); *Acanthoneura fuscipennis* of Bezzi 1913 and *T. maculipennis* of Kapoor 1993 are regarded as misidentifications of this species, here removed from synonymy with *T. hirtipes*] ..... *T. yunnana* Zia, 1963, **stat. rev.**
- Scutum normally with 5 dark vittae and dark posteriorly; face mostly dark; male with fore coxae and prosternum black and eyes strongly stalked [described from Java and recorded from Sumatra (Hardy 1986) and West Malaysia (Perkins 1938); records from India belong to *T. yunnana*, those from Singapore (Hardy 1986) and Sarawak (Hancock and

Drew 1994) belong to *T. hirtipes*, while those from Sabah (Hardy 1986) and Brunei (Chua 2002) are of females that are likely also *T. hirtipes*; *Achias horsfieldii* Westwood, 1850 and *Acanthoneura montina* Enderlein, 1911 are regarded as synonyms] ..... *T. maculipennis* (Westwood, 1847)

- 13 Posterior part of wing largely subhyaline and united with large round spot in cell  $r_{4+5}$ ; vein  $R_{2+3}$  strongly undulate and curved forwards towards costa before straightening at apex to meet costa at an acute angle; hyaline spot at base of cell  $sc$  not crossing vein  $R_1$ ; face, antennae, palpi and tibiae brown to black; male fore femur and tibia densely setose ventrally [known only from Mt Gede in western Java, Indonesia; female unknown; *Acanthoneura lieftincki* Hering, 1952 is regarded as a synonym] .....  
..... *Chaetomerella nigriacies* de Meijere, 1914
- Not as above; hyaline indentation in cell  $m$  not united with a single large spot in cell  $r_{4+5}$ ; face, antennae, palpi and tibiae normally all yellow ... 14
- 14 Wing with veins  $R_1$  and  $R_{2+3}$  often distinctly bowed and with the stigma large and enclosing 2 large, narrowly separated hyaline triangular indentations from costa, if not then vein  $R_{2+3}$  moderately undulate and wing apex subhyaline to yellowish; R-M crossvein placed at outer quarter of cell  $dm$ ; outer hyaline indentation from costa directed towards apex of cell  $br$ , basal to line of R-M crossvein; hyaline band at apex of cell  $dm$  oblique and enclosing apex of vein  $Cu_1$  to wing margin; cell  $r_{4+5}$  with a large round hyaline spot above line of DM-Cu crossvein and cell  $m$  with an elongate, oblique hyaline indentation; middle pair of scutellar setae absent; head relatively broad, at least in males; male fore femur and tibia not densely setose ventrally ..... *Freyomyia* Hardy ... 15
- Not as above; vein  $R_{2+3}$  straight to moderately undulate; if hyaline band at apex of cell  $dm$  reaches wing margin then not enclosing apex of vein  $Cu_1$ ; wing apex not subhyaline to yellowish; head not relatively broad ..... 17
- 15 Wing with veins  $R_1$  and  $R_{2+3}$  not distinctly bowed; stigma narrow and with the hyaline indentation passing through it united with the broad basal area; outer hyaline indentation from costa extending into apex of cell  $br$ ; wing apex subhyaline; scutum normally with 2 dark longitudinal vittae and a dark posterior margin [Philippines (Mindanao); female unknown; this is the type species of *Freyomyia*] ..... *F. bivittata* Hardy, 1974
- Wing (at least in males) with veins  $R_1$  and  $R_{2+3}$  distinctly bowed and with stigma large and enclosing 2 hyaline indentations, the inner not united with a large basal hyaline indentation through cell  $c$ ; cell  $br$  with an isolated hyaline spot near apex ..... 16
- 16 Wing apex subhyaline (females) or yellowish (males); cell  $c$  with a hyaline apical patch separated from the medial indentation by a brown band [Philippines (Luzon, Negros, Mindanao); here transferred from *Rioxa* Walker] ..... *F. manto* (Osten Sacken, 1882), **comb. n.**



- Wing apex yellowish (females) or brown (males); cell c with apex brown [Cambodia; here transferred from *Rioxa* Walker; a record of '*Themara alkestis*' from the same locality as the type male (Hardy 1973, 1974) is considered to be a misidentification of the female of this species] .....  
..... *F. vinnula* (Hardy, 1973), **comb. n.**
- 17 Pleuroterga with fine, erect hairs; vein  $R_{2+3}$  straight; hyaline indentation at base of stigma often extending to vein  $R_{4+5}$ ; middle pair of scutellar setae absent; head with 1 pair of orbital setae; male fore femur and tibia densely setose ventrally ..... *Ptilona* van der Wulp ... 18
- Pleuroterga bare; vein  $R_{2+3}$  straight or undulate; hyaline indentation at base of stigma not extending beyond vein  $R_1$  or  $R_{2+3}$ ; middle pair of scutellar setae present; head with 2 pairs of orbital setae ..... 25
- 18 Hyaline indentation at base of stigma ending in cell  $r_1$  and not crossing vein  $R_{2+3}$ ; apex of cell dm with an oblique, medially constricted hyaline streak [S China (Yunnan), Thailand, Laos, West Malaysia and Brunei; *P. maligna* of Hardy 1973 is a misidentification, the species here removed from synonymy with *P. persimilis*] ..... *P. conformis* Zia, 1965, **stat. rev.**
- Hyaline indentation at base of stigma extending to vein  $R_{4+5}$  and crossed by two dark veins ..... 19
- 19 Hyaline indentation in cell  $r_1$  crossing vein  $R_{4+5}$  into or across cell  $r_{4+5}$  and no isolated hyaline spot above DM-Cu crossvein ..... 20
- Hyaline indentation in cell  $r_1$  ending at or before vein  $R_{4+5}$  and an isolated hyaline spot above DM-Cu crossvein ..... 22
- 20 Thorax with a lateral yellow band from postpronotal lobe across top of anepisternum to wing base; wing with hyaline indentation from cell  $r_1$  ending before vein M and not united with large oval spot near apex of cell dm [NE Burma] ..... *P. malaisei* Hering, 1938
- Thorax without a lateral yellow band from postpronotal lobe to wing base; wing with hyaline indentation from cell  $r_1$  crossing vein M and united with spot or streak near apex of cell dm ..... 21
- 21 Basal half of wing subhyaline; cell M without a large hyaline indentation; legs mostly black [Vietnam] ..... *P. nigrifacies* Hardy, 1973
- Basal third of wing subhyaline; cell M with a large hyaline indentation; legs mostly yellow [Philippines (Mindanao)] .... *P. continua* Hardy, 1974
- 22 Cell dm with a round or oval hyaline spot at upper apex; cell  $cu_1$  with a narrow and diffuse hyaline band from vein  $Cu_1$  at middle of cell dm to wing margin at apex of vein  $A_1+Cu_2$  ..... 23
- Cell dm with an elongate hyaline spot across all or most of apex; cell  $cu_1$  with an isolated spot below vein  $Cu_1$  near middle of cell dm ..... 24

- 23 Hyaline indentation from stigma relatively broad, the spots in cells sc and  $r_1$  rectangular, wider than long; 1 pair of frontal setae [NE India, S China, Taiwan, Philippines, Bangladesh, Burma, Thailand, Laos, Vietnam, West Malaysia, Sarawak, Brunei, Java, Kalimantan, Sulawesi and Ambon; *Themara alboguttata* Doleschall, 1858, *Trypeta basifascia* Walker, 1860, *Rioxa bimaculata* Walker, 1861, *P. brevicornis* van der Wulp, 1880, *P. nigriventris* Bezzi, 1913, *Acanthoneura melanopleura* Hering, 1951 and *P. armatipes* Hering, 1953 are regarded as synonyms; *P. brevicornis* is the type species of *Ptilona*] ..... *P. confinis* (Walker, 1856)
- Hyaline indentation from stigma relatively narrow, the spots in cells sc and  $r_1$  square in shape, as wide as long; 2 pairs of frontal setae [SW China (SE Xizang [Tibet])] ..... *P. xizangensis* Wang, 1998
- 24 Cell  $cu_1$  with a pair of distinct hyaline spots along wing margin [Taiwan] ..... *P. persimilis* Hendel, 1915
- Cell  $cu_1$  diffuse along wing margin, without a pair of distinct hyaline spots [NE Burma and S China; *P. maligna* Hering, 1938, **syn. n.** and *P. persimilis* of Wang 1998 are regarded respectively as a synonym and a misidentification, with *P. maligna* apparently the male] ..... *P. dolorosa* Hering, 1938
- 25 Scutum with or without indistinct vittae, with a large black posterior patch and a black anterolateral band that includes postpronotal lobe and notopleuron; arista pubescent; vein  $R_{2+3}$  straight; hyaline indentation in cell  $r_1$  short and triangular, not crossing cell  $r_{2+3}$ ; cells  $r_{4+5}$  and br each with a very small hyaline spot; hyaline indentations in cells m and  $cu_1$  and band at apex of cell dm broad; middle scutellar setae well developed, about half length of apicals; abdomen largely black; male fore femur and tibia not densely setose ventrally [S China (Yunnan) and West Malaysia (Fig. 6)] ..... *Yunacantha nigrolimbata* Chen & Zia, 1963
- Not as above; if scutum with a large black posterior patch then abdomen broadly yellow medially, hyaline indentation in cell  $r_1$  crossing cell  $r_{2+3}$ , middle scutellar setae weak and either stigma entirely brown or cell  $r_{4+5}$  with an additional hyaline streak just distad of a large spot above DM-Cu crossvein; arista usually plumose; postpronotal lobes usually pale; vein  $R_{2+3}$  often undulate; cells dm and m with hyaline markings often narrow; male fore femur and tibia often densely setose ventrally ..... 26
- 26 Frons with 2 pairs of distinct frontal setae; cell dm with a large rounded hyaline subapical spot placed below or very close to line of R-M crossvein; cell  $r_{4+5}$  with a large rounded hyaline spot placed above or very close to line of DM-Cu crossvein; hyaline indentation at base of stigma present but not crossing vein  $R_1$ ; vein  $R_{2+3}$  straight; male fore femur and tibia densely setose ventrally; middle scutellar setae well developed, about half to two-thirds length of apicals ..... *Erectovena* Ito ... 27



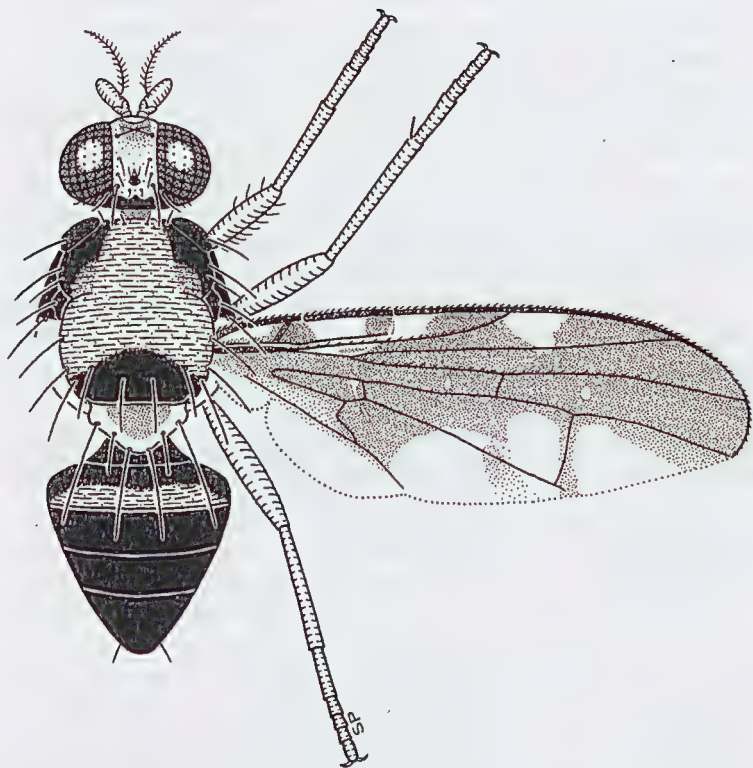


Fig. 6. *Yunacantha nigrolimbata* Chen & Zia: male from West Malaysia.

- Frons normally with 1 pair of distinct frontal setae, if with 2 distinct pairs then apex of cell dm with the hyaline spot or band placed distinctly beyond line of R-M crossvein and other characters not as above; male fore femur and tibia often without rows of dense ventral setae; middle scutellar setae often much reduced ..... 28
- 27 Two isolated hyaline spots in cell  $r_{4+5}$ , the outer midway between inner spot and wing margin; cell br with a hyaline spot before R-M crossvein [E Russia, Japan, Korea, N & E China, Taiwan, Java (possibly introduced?); *Rioxoptilona speciosa* Hendel, 1915 (see Korneyev 1999) and *R. trigonina* Zia, 1963, **syn. n.** are regarded as synonyms; *R. speciosa* is the type species of *Erectovena*] ..... *E. amurensis* (Portschinsky, 1892)
- Only a single hyaline spot in cell  $r_{4+5}$ ; cell br without a hyaline spot before R-M crossvein [S China (Yunnan), N Thailand, Laos, Vietnam] .....  
..... *E. desperata* (Hering, 1939), **comb. n.**

- 28 Wing cell  $r_{4+5}$  with 2 (or 3) hyaline spots in central area beyond level of DM-Cu crossvein, the outer spot not a longitudinal streak; scutum not broadly black posteriorly; cell br with a large hyaline spot before R-M crossvein; hyaline indentation in cell m large and broad, normally expanded marginally to beyond half way to vein M; male fore femur and tibia usually densely setose ventrally ..... *Lenitovena* Ito ... 29
- Wing cell  $r_{4+5}$  usually with only a single spot in central area above or beyond level of DM-Cu crossvein, if second spot present then this is a longitudinal streak and scutum broadly black posteriorly; cell br with or without a hyaline spot before R-M crossvein; hyaline indentation in cell m variable, often small or narrow; male fore femur and tibia with or without rows of dense ventral setae ..... *Rioxoptilona* Hendel ... 33
- 29 Wing cell  $r_{2+3}$  with a quadrate hyaline indentation from costa below apex of vein  $R_{2+3}$  ..... 30
- Wing cell  $r_{2+3}$  entirely dark apically, without a hyaline indentation from costa; middle scutellar setae weak, less than a third length of apicals ... 31
- 30 Hyaline indentation in stigma extending across vein  $R_1$  into cell  $r_1$ ; no additional hyaline spots at apices of cells  $r_{2+3}$  and  $r_{4+5}$ ; cell dm with apical hyaline band entire; vein  $R_{2+3}$  undulate [Burma; female unknown] .....  
..... *L. affluens* (Hering, 1951), **comb. n.**
- Hyaline indentation in stigma not crossing vein  $R_1$  into cell  $r_1$ ; with additional hyaline spots at apices of cells  $r_{2+3}$  and  $r_{4+5}$ ; cell dm with apical hyaline band divided into 2 isolated spots; vein  $R_{2+3}$  straight [Burma; male unknown] ..... *L. ornatipennis* (Hering, 1951), **comb. n.**
- 31 Hyaline spots in cell  $r_{4+5}$  large, crossing or almost crossing cell, band at apex of cell dm broad and indentation in cell  $cu_1$  not crossing into cell dm; wing base largely brown beyond base of cell c; vein  $R_{2+3}$  straight; arista pubescent; head with 2-3 pairs of weak frontal setae [Taiwan and Japan; placed in *Orienticaelum* Ito by Wang (1998) but here regarded as an aberrant species of *Lenitovena*] ..... *L. varipes* (Chen, 1948), **comb. n.**
- Not as above; hyaline spots in cell  $r_{4+5}$  smaller, band at apex of cell dm narrow, often divided medially and indentation in cell  $cu_1$  crossing into cell dm; arista plumose; normally only 1 pair of frontal setae ..... 32
- 32 Vein  $R_{2+3}$  moderately undulate; wing base largely dark beyond base of cell c [E Russia, Japan, Korea, N China; the wing pattern is a little variable (Korneyev 1990) and *Acanthoneura trigona sinica* Zia, 1938 is regarded as a synonym; this is the type species of *Lenitovena*] .....  
..... *L. trigona* (Matsumura, 1905)
- Vein  $R_{2+3}$  straight; wing base hyaline to near apex of cell c [NE Burma] .....  
..... *L. ultima* (Hering, 1941), **comb. n.**



- 33 Wing with either stigma entirely brown or cell  $r_{4+5}$  with a hyaline streak just beyond the spot above DM-Cu crossvein; hyaline indentation in cell  $r_1$  often crossing cell  $r_{4+5}$  and joining the subapical spot in cell dm; cell br without a spot before R-M crossvein; vein  $R_{2+3}$  straight; scutum with a large black posterior patch projecting anteriorly at least as postsutural vittae to level of notopleural calli; abdomen broadly yellow medially, black laterally; male fore femur and tibia not densely setose ..... 34
- Not as above; wing with a hyaline or yellowish indentation at base of stigma; cell  $r_{4+5}$  with at most a single spot above or beyond DM-Cu crossvein; vein  $R_{2+3}$  often undulate; scutum without a large black posterior patch; abdomen largely black or transversely banded ..... 36
- 34 Hyaline spot at base of stigma absent and no additional hyaline streak in cell  $r_{4+5}$ ; scutum with complete dark submedial vittae [West Malaysia, Sarawak, Sabah, Brunei; *Sophira* sp. near *concinna* of Hardy (1988: 114) also belongs here] ..... *R. shinonagai* (Hardy, 1986), **comb. n.**
- Hyaline spot at base of stigma present; cell  $r_{4+5}$  with a hyaline streak just beyond the spot above DM-Cu crossvein ..... 35
- 35 Hyaline indentation in cell  $r_1$  extending across wing and united with hyaline band at apex of cell dm; scutum without dark submedial vittae; arista bare in apical half [S Burma and N Thailand; female unknown] ..... *R. soluta* (Bezzi, 1913), **comb. n.**
- Hyaline indentation in cell  $r_1$  not crossing vein  $R_{4+5}$  and not united with hyaline band at apex of cell dm although that band slightly overlaps vein M into cell  $R_{4+5}$ ; scutum with complete dark submedial vittae; arista pubescent in apical half [central Thailand; male unknown; this is possibly the female of *R. soluta*] ..... *R. marginata* (Hardy, 1973), **comb. n.**
- 36 Wing distinctly narrow and elongate, vein  $R_{2+3}$  straight; hyaline indentations in cell c, stigma and cell  $r_1$  broad and confined to cells; pattern dimidiate, brown to black from base to apex anteriorly and without hyaline spots in cells br and  $r_{4+5}$ , broadly hyaline without dark bands or patches posteriorly and including almost all of cell m; male fore femur with long, whitish cilia in addition to dense black setae; middle scutellar setae well developed [India, S China (Yunnan), Thailand, Vietnam, West Malaysia] ..... *R. hemileina* (Hering, 1939), **comb. n.**
- Wing shape and pattern not as above, the posterior part of wing always with dark bands or patches intersecting it; hyaline indentation in cell  $r_1$  often crossing vein  $R_{2+3}$ ; fore femur without long, whitish cilia ..... 37
- 37 Hyaline indentation at base of stigma extending distinctly across cell  $r_1$  to vein  $R_{2+3}$  ..... 38
- Hyaline indentation at base of stigma confined to stigma, forming no more than a quadrate basal spot ..... 43

- 38 Cell br with a hyaline spot before R-M crossvein; vein  $R_{2+3}$  straight to weakly curved ..... 39
- Cell br without a hyaline spot before R-M crossvein; vein  $R_{2+3}$  weakly to distinctly undulate ..... 40
- 39 Frons with 1 pair of frontal setae; middle scutellar setae very weak, less than a third length of apicals; scutum often darkened medially but without distinct postsutural dark vittae [NE India, S China (Yunnan), Bangladesh, Burma, Thailand, West Malaysia, Sumatra, Java; records of *Acanthonevra formosana* bred from bamboo in Taiwan (Yen *et al.* 1979) appear to belong here] ..... *R. dunlopi* (van der Wulp, 1880), **comb. n.**
- Frons with 2 pairs of frontal setae; middle scutellar setae about half length of apicals; scutum with 5 dark postsutural vittae [Taiwan; records of *R. speciosa* associated with bamboo in Taiwan (Yen *et al.* 1979) appear to be this species] ..... *R. unicolor* (Shiraki, 1933), **comb. n.**
- 40 Hyaline indentations in stigma and cell  $r_1$  broad, separated by a brown band much narrower than either indentation; cell m almost entirely hyaline, the indentation reaching almost to vein M throughout its length [known only from Sumbawa, Indonesia; male unknown] ..... *R. sumbawana* (Hering, 1941), **comb. n.**
- Hyaline indentations in stigma and cell  $r_1$  separated by a brown band at least as wide as either indentation; cell m with hyaline indentation well separated from vein M over most of its length ..... 41
- 41 Hyaline indentation across stigma+cell  $r_1$  in each cell quadrate or narrow, not longer than wide and often yellowish; subscutellum and mediotergite yellow; male with fore femur and tibia not densely setose [S India] ..... *R. imparata* (Hering, 1951), **comb. n.**
- Hyaline indentation across stigma+cell  $r_1$  in each cell rectangular, longer than wide; subscutellum and mediotergite at least laterally red-brown to blackish-brown; male with fore femur and tibia densely setose ..... 42
- 42 Hyaline indentation in stigma at least as broad as the band separating it from the indentation in cell  $r_1$ ; middle scutellar setae a third to a half length of apicals; male fore femur swollen and with a row of short, black ventral setae [NE India, N Burma, N Thailand, Laos, Vietnam; previously confused with *R. ochropleura* and records from Malaysia and Indonesia refer to the latter species] ..... *R. graveleyi* (Munro, 1935), **comb. n.**
- Hyaline indentation in stigma narrower than the band separating it from the indentation in cell  $r_1$ ; middle scutellar setae very thin, about a fifth to a third length of apicals; male fore femur slender and without a row of short, black ventral setae in addition to the other rows [?Burma, West Malaysia, Sarawak, Sabah, Kalimantan, Java, Sumatra, Mentawai Is; the holotype was described from 'Burma' (Hering 1951) but was later stated



- to be from 'Java' (Hardy 1986) or Kambaiti in NE Burma (Norrbom *et al.* 1999) and is possibly mislabelled; it is here removed from synonymy with *R. graveleyi*] ..... *R. ochroleuca* (Hering, 1951), **stat. rev., comb. n.**
- 43 Vein  $R_{2+3}$  distinctly undulate; middle scutellar setae rudimentary, hair-like and less than a quarter length of apicals ..... 44
- Vein  $R_{2+3}$  straight or slightly curved but not undulate; middle scutellar setae generally distinct, usually more than a third length of apicals ..... 47
- 44 Hyaline spot in cell  $r_{4+5}$  placed above line of DM-Cu crossvein; spot in cell br before R-M crossvein present or absent ..... 45
- Hyaline spot in cell  $r_{4+5}$  placed distinctly beyond line of DM-Cu crossvein; spot in cell br before R-M crossvein present ..... 46
- 45 Hyaline indentation in cell  $r_1$  not reaching vein  $R_{4+5}$ ; cell br without a hyaline spot before R-M crossvein [known with certainty only from the Moluccan island of Seram in Indonesia; records from Sabah, East Malaysia (see Hardy 1986) appear to belong to *R. continua*, as does Fig. 9a in Hardy 1986] ..... *R. ceramensis* (de Meijere, 1913), **comb. n.**
- Hyaline indentation in cell  $r_1$  extending to or across vein  $R_{4+5}$  and of roughly uniform width, not distinctly triangular and sometimes weakly united with spot near apex of cell dm; cell br often with a hyaline spot before R-M crossvein [Sabah] ..... *R. continua* (Hardy, 1986), **comb. n.**
- 46 Hyaline indentation in cell  $r_1$  extending into cell  $r_{2+3}$  but not reaching vein  $R_{4+5}$  and broadly triangular [E Russia, China, Korea, Japan, Ryukyu Islands, Taiwan, NE India, N Burma, N Thailand, Laos, Vietnam; *Acanthoneura pteropleuralis* Hendel, 1927, *A. melanostoma* Hering, 1941, **syn. n.** and *A. amamioshimaensis* Shiraki, 1968 are regarded as synonyms; the type of *A. melanostoma* has vein  $R_{2+3}$  undulate (Hering 1941b)] ..... *R. formosana* (Enderlein, 1911), **comb. n.**
- Hyaline indentation in cell  $r_1$  reaching vein  $R_{4+5}$  and narrowly triangular [Philippines (Mindanao)] ..... *R. setosifemora* (Hardy, 1974), **comb. n.**
- 47 Head with 1 pair of frontal setae; scutum without dark vittae; cell dm with a round, medially placed subapical spot, sometimes absent; DM-Cu crossvein and/or apex of vein  $Cu_1$  lying in a paler band; posterior hyaline indentation in cell  $cu_1$  C-shaped and not extending across vein  $Cu_1$  into cell dm [NE India, S China (Yunnan), Burma, Thailand, Vietnam, West Malaysia; *Trypeta mutyca* Walker, 1849, *Rioxa vidua* Bezzi, 1913, **syn. n.** and *Acanthoneura robusta* Zia, 1963 are regarded as synonyms; this is the type species of *Rioxoptilona*] ..... *R. vaga* (Wiedemann, 1830)
- Head with 2 pairs of frontal setae, the lower pair often weak; scutum with 5 dark vittae; cell dm with an elongate subapical spot or band; DM-Cu crossvein and apex of vein  $Cu_1$  not lying in a paler band ..... 48

- 48 Cell dm with an elongate subapical band extending diffusely across vein  $Cu_1$  to hind margin of wing; male fore femur and tibia not densely setose [SE China (Hainan), N Thailand and Vietnam; *Acanthonevra ultima* of Hancock and Drew 1995a and *A. unicolor* of Wang 1998 are regarded as misidentifications (Fig. 7)] ..... *R. quatei* (Hardy, 1973), **comb. n.**
- Cell dm with an isolated subapical spot not crossing vein  $Cu_1$ ; male fore femur and tibia densely setose [Borneo (Kalimantan, Sarawak and Sabah)] ..... *R. scutellopunctata* (Hering, 1952), **comb. n.**

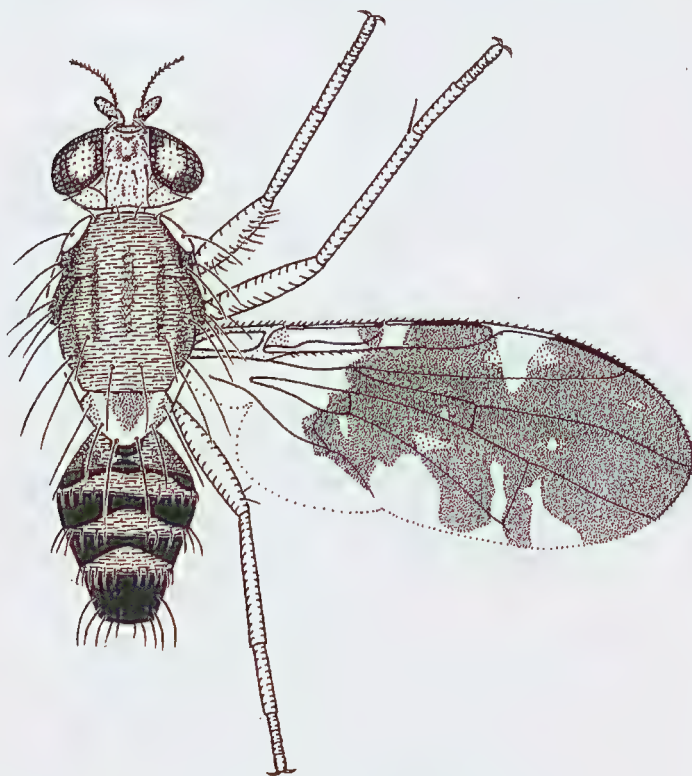


Fig. 7. *Rioxoptilona quatei* (Hardy): male from northern Thailand.

### Discussion

Many of the characters in this complex of genera are variable and the use of some in generic diagnoses is questionable. For example, dense ventral setae on the fore femur and tibia of males occur throughout several genera (*Ptilona*, *Chaetomerella*, *Erectovena*, *Lenitovena*), in some species referred here to *Rioxoptilona* and in the apparently basal species of *Themara* (*T.*



*hirsuta*) which, to some extent, resembles *C. nigrifacies*. In *R. ochropleura* these setae are less well developed and the fore femur less swollen than in the apparently closely allied *R. graveleyi*. These setae are absent in *Acanthonevra*, *Freyomyia*, *Yunacantha*, some *Rioxoptilona* (including *R. vaga*) and all other species of *Themara* where males are known. *Freyomyia* appears to be closely related to *Themara*, differing primarily in the lack of setae on veins M and Cu<sub>1</sub> and the lack of a middle pair of scutellar setae.

Setal characters of the head and thorax are often highly variable: there is normally only 1 pair of frontal setae but in some species 2 pairs of distinct setae are present and in many other cases a weak or secondary seta is often present; anepimeral and additional anepisternal setae may be distinct, weak or absent. Most genera have 2 pairs of orbital setae but *Ptilona* has only one; it also lacks a middle pair of scutellar setae. All species have the stigma elongate (generally about as long as cell c), while vein R<sub>2+3</sub> may be straight or undulate, sometimes strongly so. The extent of the dark scutal vittae seen in many species is also infraspecifically variable; the medial vitta is often reduced or absent (resulting in a species having either 4 or 5 vittae) and occasionally they are absent altogether, resulting in an entirely pale scutum.

In this study, species are recognised as valid (and in some cases removed from synonymy) if they are allopatric with similar taxa and/or show definable differences; it is recognised that further material might show, in at least some cases (e.g. *P. persimilis*, *P. dolorosa* and *P. conformis*), that these differences are no more than infraspecific variation and it is hoped that the key provided here will enable such cases to be detected. Species synonymy has been maintained (or newly proposed) where the taxa are known to be sympatric and the differences appear to be infraspecific and not clearly definable.

Additional biological information might help to further elucidate the limits and relationships of the genera accepted here. An association with bamboo is suspected but not confirmed for *Acanthonevra*, *Chaetomerella*, *Freyomyia* and *Themara*. *Ptilona* larvae live semi-aquatically in the internodes of dead bamboo culms (D. Kovac and P. Dohm pers. comm.). The larvae of several species of *Rioxoptilona* are known to utilise damaged or decaying bamboo shoots; it is this host plant usage which suggests that the presence or absence of dense ventral setae on the male fore femur and tibia, coupled with the variability seen between such species as *R. graveleyi* and *R. ochropleura*, is of no use in defining genera. *Erectovena*, *Lenitovena* and *Yunacantha* are maintained as distinct genera pending the availability of host plant data, but it is likely that eventually some or all will be synonymised with *Rioxoptilona*.

### **The type locality of *Acanthonevra fuscipennis* Macquart**

Macquart (1843) described *Acanthonevra fuscipennis* from 'Bengale' (i.e. Bengal in eastern India) but all subsequent records from India (e.g. Bezzi 1913, Kapoor 1993) refer to *Themara yunnana* and there is no actual evidence that it occurs there. Despite Macquart's very poor illustration, it

shows enough salient features to leave no doubt that his *A. fuscipennis* is the same species as that described and illustrated as *A. polyxena* (Osten Sacken) from Java (Osten Sacken 1881) and subsequently illustrated by van der Wulp (1899) from Mt Gede in Java. Given the widespread confusion between 'East India' and 'East Indies' during the 1800s, it is probable that Macquart's type also originated in Java. It is also likely that Macquart used the term 'Bengale' as an alternative to 'East India', since at the time the two names were essentially synonymous. Accordingly, Java, Indonesia is regarded here as the type locality for *A. fuscipennis*, with 'Bengal, India' considered an error. Specimens from Java tend to have the median brown band in wing cell c broader, with the hyaline spots consequently smaller, than in those from other areas but some variation is evident. As noted in the key, the taxa *A. batata* Enderlein, *A. normaliceps* Enderlein and *A. synopica* Hering are regarded as further synonyms of *A. fuscipennis*, which occurs from the extreme south of Thailand to Java and Borneo.

#### A note on *Phorelliosoma* Hendel

*Phorelliosoma* Hendel, 1914 (= *Staurellina* Hering, 1941, **syn. n.**; = *Mimosophira* Hardy, 1973; = *Orienticaelum* Ito, 1984, **syn. n.**) is an Oriental genus of acanthonevrines that includes two species formerly placed in *Acanthonevra sens. lat.* It is separated from the *Acanthonevra* complex by the following combination of characters: arista pubescent, head with 2 pairs each of frontal and orbital setae, scutum with no trace of a medial vitta, presutural and anepimeral setae absent, 3 pairs of scutellar setae, wing relatively narrow with the pattern *Lenitovena*-like (those species formerly placed in *Orienticaelum*) or reduced to isolated patches, cell c entirely and cell cu<sub>1</sub> almost entirely hyaline, vein R<sub>4+5</sub> sparsely setose to about r-m crossvein, cell c elongate and stigma about half to two-thirds its length.

Its generic relationships are uncertain, although the elongate and entirely hyaline cell c, plus the 4 scutal vittae present in some species, suggest a relationship with the *Sophira* complex. I can find no characters of generic value to separate the above synonyms and consider them to be congeneric. *Mimosophira* was placed as a synonym of *Phorelliosoma* by Wang (1998). *Chaetomerella varipes* Chen, placed in *Orienticaelum* by Wang (1998), shows many, but not all, of the above characters and is treated here as an aberrant species of *Lenitovena*; it has swollen fore femora with a row of ventral setae (Chen 1948), a typical *Acanthonevra*-complex scutal pattern (including a dark medial vitta) and cell c is dark basally and apically and about as long as the stigma. Six species of *Phorelliosoma* are recognised:

*P. ambitiosum* Hering, 1941 (NE India).

*P. femoratum* (Shiraki, 1933), **comb. n.** (Japan) [ex *Orienticaelum*].

*P. hexachaeta* Hendel, 1914 (= *Mimosophira rubra* Hardy, 1973) (Taiwan, Vietnam) [type species]. Records from SW China and NE Burma refer to *P. hilaratum* Hering.



*P. hilaratum* Hering, 1941 (NE Burma, SW China (SE Xizang [Tibet])). This species differs from *P. hexachaeta* in the absence of a pair of dark scutellar spots and a slightly more reduced wing pattern.

*P. parvisetalis* (Hering, 1939), **comb. n.** (China) [ex *Orienticaelum*].

*P. trypetopsis* (Hering, 1941), **comb. n.** (NE Burma) [ex *Staurellina*].

## Acknowledgements

I thank Nigel Wyatt (Natural History Museum, London) for access to specimens in his care, Damir Kovac and Patrick Dohm (Forschungsinstitut Senckenberg, Frankfurt am Main) for biological information, K.J. David (National Research Centre for Citrus, Nagpur) for additional information on *Themara yunnana* and Scott Ginn (Australian Museum, Sydney) for the images of *Acanthonevra fuscipennis*. I also thank Zoë Simmons (Oxford University Museum of Natural History), Marc De Meyer (Royal Museum for Central Africa, Tervuren) and Federica Turco (Queensland Museum) for help in obtaining literature and Susan Phillips and Christine Lambkin for the habitus illustrations.

## References

- ALLWOOD, A.J., CHINAJARIYAWONG, A., DREW, R.A.I., HAMACEK, E.L., HANCOCK, D.L., HENGSAWAD, C., JIPANIN, J.C., JIRASURAT, M., KONG KRONG, C., KRITSANEPAIBOON, S., LEONG, C.T.S. and VIJAYSEGARAN, S. 1999. Host plant records for fruit flies (Diptera: Tephritidae) in South East Asia. *Raffles Bulletin of Zoology* Supplement 7: 1-92.
- BEZZI, M. 1913. Indian trypanids (fruit-flies) in the collection of the Indian Museum, Calcutta. *Memoirs of the Indian Museum* 3: 53-175, pls 8-10.
- CHEN, S.H. 1948. Notes on Chinese Trypetinae. *Sinensia* 18: 69-123.
- CHUA, T.H. 2000. New species and records of Trypetinae from Brunei Darussalam (Diptera: Tephritidae). *Raffles Bulletin of Zoology* 48(1): 143-146.
- CHUA, T.H. 2002. New records of Trypetinae from Brunei Darussalam (Diptera: Tephritidae). *Malayan Nature Journal* 56(1): 43-48.
- DOHM, P., KOVAC, D., FREIDBERG, A. and HASHIM, R.B. 2008. Biology of the Oriental bamboo-inhabiting fly *Felderimyia gombakensis* and observations on mating trophallaxis in *Felderimyia* (Insecta, Diptera, Tephritidae, Phytalmiinae, Acanthonevrini). *Senckenbergiana Biologica* 88(2): 311-318.
- HANCOCK, D.L. and DREW, R.A.I. 1994. New species and records of Asian Trypetinae (Diptera: Tephritidae). *Raffles Bulletin of Zoology* 42(3): 555-591.
- HANCOCK, D.L. and DREW, R.A.I. 1995a. Observations on the genus *Acanthonevra* Macquart in Thailand and Malaysia (Diptera: Tephritidae: Trypetinae). *Entomologist* 114(2): 99-103.
- HANCOCK, D.L. and DREW, R.A.I. 1995b. New genera, species and synonyms of Asian Trypetinae (Diptera: Tephritidae). *Malaysian Journal of Science* 16A: 45-59.
- HANCOCK, D.L. and DREW, R.A.I. 2003. New species and records of Phytalmiinae (Diptera: Tephritidae) from Australia and the south Pacific. *Australian Entomologist* 30(2): 65-78.
- HANCOCK, D.L. and DREW, R.A.I. 2004. Notes on the genus *Euphranta* Loew (Diptera: Tephritidae), with description of four new species. *Australian Entomologist* 31(4): 151-168.

- HARDY, D.E. 1973. The fruit flies (Tephritidae–Diptera) of Thailand and bordering countries. *Pacific Insects Monograph* 31: 1-353, pls 1-8.
- HARDY, D.E. 1974. The fruit flies of the Philippines (Diptera: Tephritidae). *Pacific Insects Monograph* 32: 1-266, pls 1-6.
- HARDY, D.E. 1986. Fruit flies of the subtribe Acanthonevrina of Indonesia, New Guinea, and the Bismarck and Solomon Islands (Diptera: Tephritidae: Trypetinae: Acanthonevrini). *Pacific Insects Monograph* 42: 1-191.
- HARDY, D.E. 1988. Fruit flies of the subtribe Gastrozonina of Indonesia, New Guinea and the Bismarck and Solomon Islands (Diptera, Tephritidae, Trypetinae, Acanthonevrini). *Zoologica Scripta* 17: 77-121.
- HERING, [E].M. 1941a. Entomological results from the Swedish Expedition 1934 to Burma and British India. Diptera: Tephritidae. Nachtrag. *Archiv für zoologi* 33B(11): 1-7.
- HERING, E.M. 1941b. Neue Dacinae und Trypetinae des Zoologischen Museums der Universität Berlin. *Siruna Seva* 3: 1-25.
- HERING, E.M. 1951. Neue Fruchtfliegen der Alten Welt. *Siruna Seva* 7: 1-16.
- HERING, E.M. 1952. Fruchtfliegen (Trypetidae) von Indonesien (Dipt.). *Treubia* 21: 263-270.
- KAPOOR, V.C. 1993. *Indian fruit flies (Insecta: Diptera: Tephritidae)*. International Science Publisher, New York; vii + 228 pp.
- KORNEYEV, V.A. 1990. Fruit flies of the subfamilies Phytalmiinae, Acanthonevrinae and Adraminae (Diptera, Tephritidae) of the far eastern USSR. Pp 116-124, in: Lelei, S.S. (ed.), *News of insect systematics of Soviet far east*. Academy Nauk SSSR, Dalnevostochnoe Otdelenie, Vladivostok; 136 pp. [in Russian].
- KORNEYEV, V.A. 1999. Phylogenetic relationships among higher groups of Tephritidae. Pp 73-113, in: Aluja, M. and Norrbom, A.L. (eds), *Fruit flies (Tephritidae): phylogeny and evolution of behavior*. CRC Press, Boca Raton; xviii + 944 pp.
- MACQUART, P.J.M. 1843. Diptères exotiques nouveaux ou peu connus. (2(3)). *Mémoires de la Société Royale des Sciences, de l'Agriculture et des Arts de Lille* 1842: 162-460, 36 pls.
- NORRBOM, A.L., CARROLL, L.E., THOMPSON, F.C., WHITE, I.M. and FREIDBERG, A. 1999. Systematic database of names. Pp 65-251, in: Thompson, F.C. (ed.), *Fruit fly expert identification system and systematic information database*. *Myia* 9: ix + 524 pp.
- OSTEN SACKEN, C.R. 1881. Enumeration of the Diptera of the Malay Archipelago collected by Prof. Odoardo Beccari, Mr L.M. D'Albertis and others. *Annali del Museo Civico di Storia Naturale di Genova* (1880-1881) 16: 393-492.
- PERKINS, F.A. 1938. Results of the Oxford University Expedition to Sarawak (Borneo), 1932. Diptera, Trypanidae. *Annals and Magazine of Natural History* (11) 2: 401-409, pl. xv.
- PERMKAM, S. 2005. Bamboo-shoot fruit flies (Diptera: Tephritidae) of southern Thailand. *Songklanakarin Journal of Science and Technology* 27(2): 223-237.
- van der WULP, F.M. 1899. Aanteekeningen betreffende Oost-Indische Diptera. *Tijdschrift voor Entomologie* (Amsterdam) (1898) 41: 205-223, pl. 10.
- WANG, X.-J. 1998. The fruit flies (Diptera: Tephritidae) of the East Asia Region. *Acta Zootaxonomica Sinica* 21(Supplement): viii + 338 pp + 268 figs + 41 pls.
- YEN, D.F., TSENG, Y.H. and WU, S.S. 1979. *Family Tephritidae of Taiwan. (2). The fruit flies found associated with bamboo in Taiwan*. Tainan Branch Office, Bureau of Commodity Inspection and Quarantine, Ministry of Economic Affairs; 40 pp.

**NEW SPECIES OF THE GENERA *MELISODERA* WESTWOOD,  
*RHAEBOLESTES* SLOANE AND *MORIODEMA* CASTELNAU FROM  
AUSTRALIA (COLEOPTERA: CARABIDAE: PSYDRINI)**

MARTIN BAEHR

Zoologische Staatssammlung, Münchenhausenstrasse 21, D-81247 Munich, Germany

(E-mail: martin.baehr@zsm.mwn.de)

**Abstract**

Three Australian species of the psydrene genera *Melisodera* Westwood, *Rhaebolestes* Sloane and *Moriodema* Castelnau are described as new: *Melisodera gigas* from northern New South Wales, *Rhaebolestes lamingtonensis* from southeastern Queensland and *Moriodema regalis* from southeastern New South Wales. Keys to the species of the three genera are provided.

**Introduction**

During sorting material of carabid beetles in the Australian National Insect Collection, Canberra and those sent from the Queensland Museum, Brisbane, three hitherto undescribed species of Psydriini: *Melisoderina* of the genera *Melisodera* Westwood, *Rhaebolestes* Sloane and *Moriodema* Castelnau from Australia were located and are described in the present paper.

The psydrene subtribe *Melisoderina* (see Moore 1963, Baehr 1999, 2003), which Lorenz (1998, 2005) regarded as a separate tribe not to be included in Psydriini, occurs in southeastern Australia. It presently includes the genera *Melisodera* Westwood, 1835, *Celanida* Castelnau, 1867, *Moriomorpha* Castelnau, 1867, *Moriodema* Castelnau, 1867 and *Rhaebolestes* Sloane, 1903 (Moore 1963). Most of these genera are so far monospecific, with only *Moriomorpha* presently including two species. All *Melisoderina* species are medium to large, dark reddish to black beetles with a distinct apical sublateral elytral ridge, an elongate metepisternum and metasternum and lack a double row of adhesive setae on their male fore tarsi. Moore (1963) redefined the genera of the *Melisoderina* and his key to the genera still applies. A separate paper deals with the genus *Moriomorpha* (Baehr in press).

**Materials and methods**

Measurements were taken using a stereo microscope with an ocular micrometer: body length from apex of labrum to apex of elytra; length of orbit from the posterior margin of the eye to the "neck" angle; length of pronotum along midline; width of apex of pronotum at the most advanced part; length of elytra from the most advanced part of the humerus to the very apex. For estimation of the relative length of the antenna the 6th antennomere was measured; for its width measurement the depressed surface was chosen.

For dissection of the male genitalia the specimens were softened for a night in a jar under moist atmosphere, then the genitalia were removed and cleaned for a short while in hot KOH. The habitus photographs were taken with a digital camera using ProgRes Capture Pro 2.6 and AutoMontage and then worked with Corel Photo Paint 11.



Label data for type specimens are given in full with exact wording, including all ciphers, notes of determinators and curators and printed labels. A / with a blank before and after it denotes a new label, two blanks mark a new line on the same label. Holotypes of the new species are deposited in the Australian National Insect Collection, Canberra (ANIC) and the Queensland Museum, Brisbane (QM).

### Abbreviations

Abbreviations used are: ACT – Australian Capital Territory; NSW – New South Wales; QLD – Queensland; VIC – Victoria; ce. – central eastern; e. – eastern; ne. – northeastern; s. – southern; se. – southeastern; > – larger or longer than; < – smaller or shorter than.

### Genus *Melisodera* Westwood

*Melisodera* Westwood, 1835: pl. 132. – Csiki 1929: 485; Moore 1963: 281; Moore *et al.* 1989: 153; Lorenz 1998: 224; 2005: 245. Type species: *Melisodera picipennis* Westwood, 1835, by monotypy.

**Diagnosis.** Large, elongate species with well developed metathoracic wings, cordate, bisetose pronotum, short antennae, laterally well produced eyes, squamose male protarsi, straight mesotibiae and dorsoventrally depressed tarsi.

**Comments.** Until now only the type species was recorded. Csiki (1929) united this genus with *Moriomorpha* Castelnau and *Moriodema* Castelnau, but this decision has neglected the important character states that distinguish the three genera, which were reinstated by Moore (1963). Lorenz (1998, 2005) erroneously included *Moriomorpha victoriae* Castelnau in this genus. The nominate species, *M. picipennis* Westwood, 1835, occurs from eastern Victoria to southeastern New South Wales and the Australian Capital Territory (Moore 1963, 1964).

### *Melisodera picipennis* Westwood (Fig. 5)

*Melisodera picipennis* Westwood, 1835: pl. 132. – Csiki 1929: 485; Moore 1963: 281; Moore *et al.* 1987: 153; Lorenz 1998: 224; 2005: 245.

**Additional records.** VICTORIA: 1 ♀, Mt. Macedon, H.W. Davey (ANIC); 1 ♂, Lake Mountain, 1450 m, 6.ii.1994, G.J. Krake (Coll. W. Lorenz, Tutzing). AUSTRALIAN CAPITAL TERRITORY: 1 ♀, Mt. Gingera, 6.ii.1964, B.P. Moore (ANIC).

**Diagnosis.** Easily distinguished from *M. gigas* sp. n. by its much smaller size and narrower, much less cordate prothorax. See below for measurements.

**Comments.** Occurs from eastern Victoria to southeastern New South Wales and the Australian Capital Territory (Moore 1963, 1964). Moore (1964) described its larvae, collected with teneral adults, found apparently feeding on stag beetle larvae inside a log in alpine woodland at high altitude.

*Melisodera gigas* sp. n. (Figs 1, 6, 11)

*Type. Holotype* ♀, NEW SOUTH WALES: 'F.W. / N.S.W. Ebor 13.1.1963 J. Balderson' (In ANIC).

*Diagnosis.* Easily distinguished from *M. picipennis* Westwood by its much larger size and its very wide, markedly cordate prothorax.

*Description.* Measurements. Length: 17.4 mm; width: 5.7 mm. Ratios. Length eye/orbit: 4.5; length/width of 6th antennomere: 0.95; width/length of pronotum: 1.43; width of apex/width of base of pronotum: 1.04; widest diameter/width of base of pronotum: 1.39; length/width of elytra: 1.82.

Colour (Fig. 11). Head and pronotum black, elytra dark brown; palpi, femora and apices of protibiae reddish-piceous; antennae, tibiae and tarsi black. Undersurface black but abdomen dark piceous.

Head (Fig. 11). Head of average size but much narrower than the pronotum. Eye relatively small but laterally markedly projecting. Orbit short, very convex, forming an almost right angle with the neck. Clypeal suture distinct; clypeus anteriorly slightly concave; labrum anteriorly moderately concave. Mandibles short, inner surface parallel-sided, towards apex markedly incurved. Scrobe in basal part deep; seta in scrobe elongate. Mentum bisetose, with short, obtuse tooth. Submentum bisetose and with two deep pits between setae; setae elongate. Glossa elongate, with two elongate setae; paraglossae hyaline, narrow, far surpassing the glossa. Lacinia with two rather dense rows of setae. Both palpi rather compact, impilose, with obtuse apex. Antennae very short; median antennomeres wider than long, 1st-3rd antennomeres glabrous, from 5th antennomere lateral surfaces with dense setosity and glandular areas. Frons raised laterally and in middle; frontal sulci deep, irregularly triangular, curved laterad in posterior part. Inner margin of eye with a deep sulcus which encircles the eye posteriad and on the upper surface behind frons is joined by a shallow, transverse but slightly convex sulcus. Posterior supraorbital seta inserted in front of posterior margin of eye. Surface extremely finely, sparsely punctate, lacking microreticulation, very glossy; punctures only visible at very high magnification. Only labrum with very fine, superficial, isodiametric microreticulation.

Pronotum (Fig. 6). Cordiform, short and very wide; base about as wide as apex, widest diameter at apical third. Apex straight in middle; apical angles very slightly produced but widely rounded. Lateral margins very convex, sinuate just in front of base. Basal angles rectangular, slightly produced laterad; base straight in middle, slightly oblique laterally. Dorsal surface very convex. Apex in middle not margined, lateral border narrowly margined, margin slightly upturned; lateral sulcus narrow and rather shallow, not widened towards base; base distinctly margined. Median line distinct, slightly impressed and very finely crenulate, almost reaching apex, deepened towards base. Anterior transverse sulcus barely indicated; posterior sulcus distinct.

Basal grooves rather deep, wide, laterally with a linear impression. Anterior marginal seta situated at widest diameter at apical third; posterior marginal seta situated at basal angle. Surface with some very shallow transverse impressions; with extremely fine punctures which are perceptible only at very high magnification; without microreticulation; very glossy.

Elytra (Fig. 11). Elongate, largely parallel-sided, dorsally very convex. Humeral angle rounded with tiny denticle. Lateral margin in basal third very slightly concave, then straight; apical part evenly rounded to suture. Scutellary stria elongate, situated on 1st interval, consisting of about 8 deep punctures. Basal margin remarkably crenulate. Six median striae complete, deeply impressed and very coarsely punctate, only near apex impunctate; 7th stria barely visible. Six median intervals gently convex. Subapical carina distinct. Scutellary pore and seta absent. 3rd interval with two setiferous punctures behind middle, both adjacent to 3rd stria. Marginal series consisting of 15-16 punctures and setae, rather interrupted in middle; punctures small, setae of very variable length. At apex with an elongate seta situated near end of 3rd stria. Intervals impunctate and glabrous, with extremely fine and highly superficial microreticulation that consists of very dense, irregularly isodiametric to slightly transverse meshes, only visible at very high magnification.

Lower surface. Impunctate and impilose, with extremely fine and highly superficial microreticulation which is only visible at very high magnification. Metepisternum narrow and elongate, about 2.5 x as long as wide at apex. Terminal abdominal sternum in female polysetose, with 4 setae on the one and 3 setae on the other side.

Legs. Rather short and compact. All tibiae straight. Protibiae sulcate at anterior surface, on lateral surface with 5-6 serrations and short ensiform setae, the apex produced laterad. Lateral part of apex of mesotibiae strongly produced laterad, lower and anterior surfaces with dense fringe of setae, dorsal surface slightly serrulate. Tarsi short, slightly depressed; 5th tarsomeres with 2 pairs of setae at lower surface. Tarsal claws elongate, glabrous.

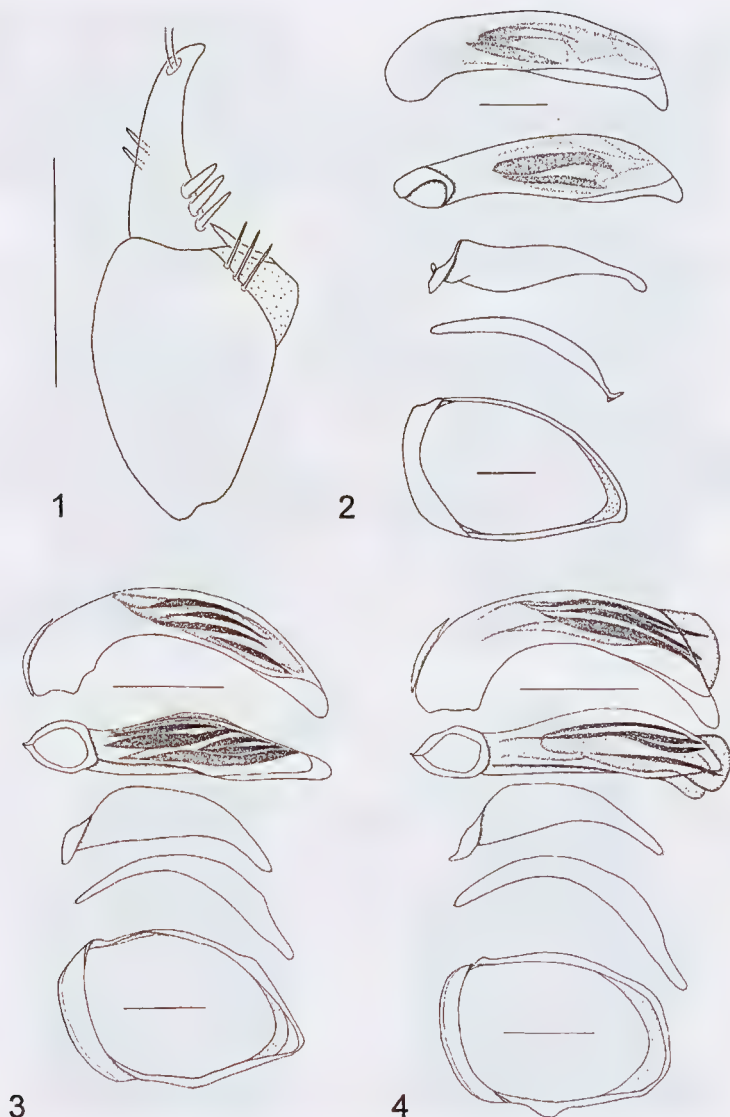
Male genitalia. Unknown.

Female genitalia (Fig. 1). Gonocoxite 1 elongate, with three elongate setae at ventro-lateral rim. Gonocoxite 2 narrow and elongate, almost straight, only towards apex slightly curved, with three elongate ensiform setae at the medio-lateral margin close to base, two slightly shorter ensiform setae at about middle of the dorso-median margin and two fairly elongate nematiform setae arising from a circular pit close to apex.

Variation. Unknown.

*Etymology.* The Greek word '*gigas*' means 'enormous' and refers to the very large size of the species as compared with its congener.

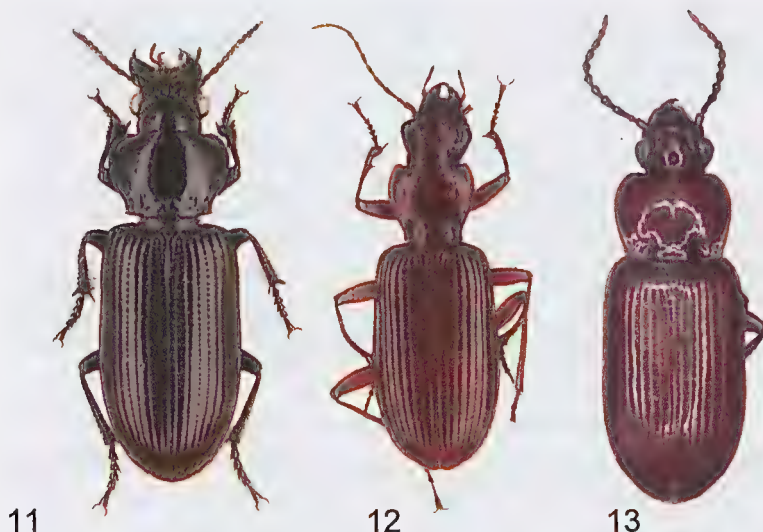




**Figs 1-4.** (1) *Melisodera gigas* sp. n. Female gonocoxites 1 and 2. Scale bar: 0.5 mm. (2-4) Male genitalia: aedeagus, left side and lower surface, left and right parameres, genital ring. Scale bars: 0.5 mm. (2) *Rhaebolestes lamingtonensis* sp. n.; (3) *Moriodesma mcoyei* Castelnau; (4) *M. regalis* sp. n.



**Figs 5-10.** (5-8) Pronotum. (5) *Melisodera picipennis* Westwood; (6) *M. gigas* sp. n.; (7) *Rhaebolestes walkeri* Sloane, holotype; (8) *R. lamingtonensis* sp. n. (9-10) Head and pronotum. (9) *Moriodema mcoyei* Castelnau; (10) *M. regalis* sp. n.



**Figs 11-13. Habitus.** (11) *Melisodera gigas* sp. n.; (12) *Rhaebolestes lamingtonensis* sp. n.; (13) *Moriodema regalis* sp. n. Body lengths: 17.4 mm; 15.2 mm; 8.8 mm.

*Distribution.* New England Tableland, northeastern New South Wales.

*Collecting circumstances.* Not recorded.

*Comment.* This specimen was mentioned previously by Moore (1963) as a probable new species.

#### Measurements and ratios of the species of *Melisodera*

N = number of specimens measured; body length in mm; l eye/orbit = ratio length of eye/length of orbit; l/w 6<sup>th</sup> ant = ratio length/width of 6<sup>th</sup> antennomere; w/l pron = ratio width/length of pronotum; apex/base pron = ratio width of apex/width of base of pronotum; dia/base pron = ratio widest diameter/width of base of pronotum; l/w elytra = ratio length/width of elytra.

Species	N	Body length	l eye/orbit	l/w 6 <sup>th</sup> ant	w/l pron	Apex/base pron	Dia/base pron	l/w elytra
<i>M. picipennis</i>	3	11.2-11.5	3.7-3.8	1.0	1.25-1.30	0.96-0.98	1.21-1.23	1.75-1.80
<i>M. gigas</i>	1	17.4	4.5	0.95	1.43	1.04	1.39	1.82

#### Key to the species of the genus *Melisodera* Westwood

- 1 Body size larger, length >17 mm; eye laterally more produced; pronotum relatively wider, with narrower base, strongly cordiform, ratio width/length > 1.40 (Fig. 6). New England Tableland, ne. NSW ..... *gigas* sp. n.



- Body size smaller, length <12 mm; eye laterally slightly less produced; pronotum relatively narrower, with wider base, less cordiform, ratio width/length < 1.30 (Fig. 5). e. Vic, ACT, se. NSW .....  
..... *picipennis* Westwood, 1835

### Genus *Rhaebolestes* Sloane

*Rhaebolestes* Sloane, 1903: 589. – Csiki 1929: 486; Moore 1963: 280; Moore *et al.* 1987: 153; Lorenz 1998: 224; 2005: 245. Type species: *Rhaebolestes walkeri* Sloane, 1903, by monotypy.

**Diagnosis.** Large, narrow and elongate species characterized by presence of the metathoracic wings, elongate antennae, moderately protruded eyes, squamose male protarsi, markedly curved mesotibiae and tarsi weakly laterally compressed.

### *Rhaebolestes walkeri* Sloane (Fig. 7)

*Rhaebolestes walkeri* Sloane, 1903: 589. – Csiki 1929: 486; Moore 1963: 280; Moore *et al.* 1987: 153; Lorenz 1998: 224; 2005: 245.

**Type.** Holotype ♂, 'Ourimbah Sydney district N.S.W. J.J.W. 14/4/1900 / *Rhaebolestes walkeri* Sl. / HOLOTYPE *Rhaebolestes walkeri* Sl. PJD' (In ANIC).

**Diagnosis.** Very similar to *R. lamingtonensis* sp. n.; distinguished by less cordiform pronotum having a wider base and its apex slightly sinuate and the basal margin of the elytra slightly oblique. See below for measurements.

**Comments.** The type locality is about 60 km north of Sydney. Unfortunately the unique male holotype lacks genitalia so comparison with the genitalia of *R. lamingtonensis* is not possible.

### *Rhaebolestes lamingtonensis* sp. n. (Figs 2, 8, 12)

**Type.** Holotype ♂, QUEENSLAND: 'Binna Burra Lamington NP, Qld. 3 Feb 1963 G. Monteith QM Reg No. T89290' (In QM: Type Reg. No. QMT 82920).

**Diagnosis.** Very similar to *R. walkeri* Sloane, distinguished by a more cordiform pronotum having a narrower base and with its apex not sinuate and the basal margin of the elytra almost straight.

**Description.** Measurements. Length: 15.2 mm; width: 5.0 mm. Ratios. Length eye/orbit: 1.0; length/width of 6th antennomere: 1.85; width/length of pronotum: 1.10; width apex/base of pronotum: 1.33; widest diameter/width of base of pronotum: 1.51; length/width of elytra: 1.78.

**Colour** (Fig. 12). Upper and lower surfaces uniformly reddish, only apex of mandibles and apical antennomeres very slightly darker.

**Head** (Fig. 12). Comparatively narrow and elongate. Eye relatively small, about as long as the orbit, laterally moderately projecting. Orbit oblique and slightly convex, forming a weak angle with the neck. Clypeal suture distinct;

labrum gently concave anteriorly. Mandibles very elongate, with elongate mandibular seta in the scrobe. Mentum bisetose, with tooth wide and shallow, obtuse at apex. Gula quadrisetose; setae very long. Glossa elongate, with two very long setae; paraglossae hyaline, narrow, far surpassing the glossa. Lacinia with a few obtuse teeth and sparse setae. Both palpi narrow and elongate, impilose, obtuse at apex. Antennae comparatively elongate, surpassing base of pronotum by about one antennomere; 1st-3rd antennomeres glabrous, central antennomeres almost twice as long as wide, densely pilose on the narrow surfaces. Frons slightly convex; frontal sulci shallow, bisinuate; middle of frons with a few shallow, linear impressions. Neck sulcus not impressed. Posterior supraorbital seta inserted narrowly in front of the posterior margin of the eye. Surface impunctate, almost lacking microreticulation; very glossy. Only laterally extremely fine traces of highly superficial, transverse microreticulation are visible at very high magnification.

Pronotum (Fig. 8). Cordiform, rather narrow, base much narrower than apex, widest behind basal third. Apex in middle excised though straight, apical angles well produced, obtusely rounded at tip. Lateral margins evenly convex, a short distance in front of base excised and there almost straight. Basal angles rectangular, base straight, laterally very slightly oblique. Dorsal surface rather depressed. Apex not margined, lateral border narrowly margined, margin slightly upturned, lateral sulcus narrow and slightly impressed, base distinctly margined. Median line very shallow, not reaching apex or base. Anterior transverse sulcus barely perceptible; posterior transverse sulcus quite deep. Basal grooves deep, rather linear. Anterior marginal seta situated at widest point behind apical third, posterior marginal seta situated at basal angle. Surface impunctate, with several very fine transverse striae and with occasional traces of very superficial and extremely fine, transverse microreticulation visible only at very high magnification; surface very glossy.

Elytra (Fig. 12). Elongate, slightly widened towards apical third, dorsally convex though disk depressed. Humeral angle almost evenly rounded. Lateral margin in basal third very slightly concave, then gently convex; apical part evenly rounded to suture. Scutellary stria elongate. All striae present and complete, moderately impressed, barely punctate. Intervals gently convex. Subapical carina weakly developed and rather short. Scutellary pore and seta situated at base of 2nd stria. 3rd interval with three setiferous punctures, all adjacent to 3rd stria. Marginal series consisting of 17 punctures and setae, rather interrupted in middle; punctures small; setae of very different length. At apex with an elongate seta situated near end of 5th stria and with a smaller one medially of it. Intervals impunctate, with extremely fine and very superficial microreticulation that consists of very dense, transverse lines, visible only at high magnification.

Lower surface. Impunctate and impilose, with extremely fine and very superficial microreticulation of very dense transverse lines. Metepisternum narrow and elongate, about 2.5 x as long as wide at apex. Terminal abdominal sternum quadrisetose in male.

Legs. Comparatively very slender and elongate, particularly the tibiae. Profemur with a strongly protruded tooth on anterior surface proximal of middle. Protibia very slightly curved; three basal tarsomeres of male protarsus asymmetric, bearing a sparse vestiture of adhesive hairs. Mesotibia markedly curved, inner surface with dense fringe of setae, outer surface slightly serrulate. Tarsi narrow and elongate, meso- and metatarsi weakly compressed laterally, protarsi less distinctly compressed; 5th tarsomeres glabrous at lower surface. Tarsal claws extremely slender and elongate, glabrous.

Male genitalia (Fig. 2). Genital ring wide, oval-shaped, asymmetric, with wide, oblique base and narrowly rounded apex. Aedeagus rather compact, asymmetric, apex obtusely rounded, slightly curved down and directed to the right side. Orifice very elongate, situated on the upper surface. Folding of internal sac simple, with two elongate, weakly sclerotized folds in middle. Both parameres large and elongate, asetose, the left larger than the right.

Female genitalia. Unknown.

Variation. Unknown.

*Etymology.* The name refers to the type locality of this species, Lamington National Park.

*Distribution.* Lamington Nat. Pk, southeastern Queensland. Known only from the type locality.

*Collecting circumstances.* Not recorded.

### Measurements and ratios of the species of *Rhaebolestes*

For abbreviations see under *Melisodera*.

Species	N	Body length	l eye/ orbit	l/w 6 <sup>th</sup> ant	w/l pron	Apex/ base pron	Dia/base pron	l/w elytra
<i>R. walkeri</i>	1	15.7	1.0	1.95	1.08	1.15	1.35	1.75
<i>R. lamingtonensis</i>	1	15.2	1.0	1.90	1.10	1.33	1.51	1.78

### Key to the species of the genus *Rhaebolestes* Sloane

- 1 Base of pronotum wider, ratio widest diameter/base 1.35 (Fig. 7); base of elytra distinctly oblique, basal angle slightly angulate; apex of elytra distinctly sinuate, lateral margin not excised at basal third. ce. NSW (slightly north of Sydney) ..... *walkeri* Sloane, 1903



- Base of pronotum narrower, ratio widest diameter/base 1.50 (Fig. 8); base of elytra almost transverse, basal angle barely angulate; apex of elytra not sinuate, lateral margin perceptibly excised at basal third. se. QLD (Lamington National Park) ..... *lamingtonensis* sp. n.

### Genus *Morioidema* Castelnau

*Morioidema* Castelnau 1867: 38. – Castelnau 1868: 124; Sloane 1903: 587; Csiki 1929: 485; Moore 1963: 281; Moore et al. 1987: 154; Lorenz 1998: 224; 2005: 245. Type species: *Morioidema mcoyei* Castelnau, 1867 (= *Morioidema paramattensis* Castelnau, 1867), by subsequent designation by Moore (1963).

**Comments.** Medium sized species, characterized by rather wide and depressed body shape, presence of the metathoracic wings, short antenna, laterally moderately projected eyes, squamose male protarsi, almost straight mesotibiae and dorsoventrally depressed tarsi.

### *Morioidema mcoyei* Castelnau (Figs 3, 9)

*Morioidema mcoyei* Castelnau 1867: 39. – Castelnau 1868: 125; Csiki 1929: 485; Moore 1963: 281; Moore et al. 1987: 154; Lorenz 1998: 224; 2005: 245.

*Morioidema paramattensis* Castelnau 1867: 39. – Sloane 1903: 587.

**Additional record.** QUEENSLAND: 1 ♀, Binna Burra, Lamington Nat. Pk., 25.iii.-4.iv.1985, J. & N. Lawrence (ANIC). Lectotype and some specimens from eastern Victoria and southeastern New South Wales also examined.

**Diagnosis.** Distinguished from *M. regalis* sp. n. by wider pronotum, wider and shorter elytra, larger and more produced eyes, slightly less curved aedeagus which has a slightly wider apex and much more triangular genital ring.

**Partial redescription.** Measurements. Length: 8.7-9.9 mm; width: 3.25-3.6 mm. Ratios. Length eye/orbit: 2.9-3.0; length/width of 6th antennomere: 1.0; width/length of pronotum: 1.31-1.36; width of apex/width of base of pronotum: 0.82-0.84; widest diameter/width of base of pronotum: 1.22-1.25; length/width of elytra: 1.66-1.69. For shape of head and pronotum see fig. 9.

Male genitalia (Fig. 3). Genital ring large, asymmetrically triangular but laterally slightly convex, with oblique apex shortly rounded at the tip. Aedeagus narrow, laterally compressed, widened in middle, evenly narrowed towards apex; lower surface in apical half straight, with a distinct ridge in basal half. Apex short and fairly wide, widely rounded at tip. Orificium rather short, situated on upper right side. Internal sac with several elongate, moderately sclerotized folds. Both parameres comparatively short and stout, with rather short apices. The very apex of both parameres with two or three extremely short setae which are visible only at very high magnification.

**Distribution.** According to Moore et al. (1987) this species was recorded from eastern Victoria, southeastern New South Wales and the Australian

Capital Territory. The new records extend the range to include southeastern Queensland.

*Collecting circumstances.* Mostly unrecorded, but the specimen from Lamington NP was 'collected at light'.

*Comments.* *Moriodema paramattensis* Castelnau was synonymized with *M. mcoyei* Castelnau by Sloane (1903). I examined the lectotype of *M. mcoyei* from the Genoa Museum.

***Moriodema regalis* sp. n. (Figs 4, 10, 13)**

*Type.* *Holotype* ♂, NEW SOUTH WALES: 'N.S.W: 34.152°Sx151.019°E Fosters Flat, Royal NP, 18Apr2011 GMonteith Barkspry, RF along creek., 90m 18873' (In QM: Type Reg. No. QMT 156032).

*Diagnosis.* Distinguished from *M. mcoyei* Castelnau, 1867 by its narrower pronotum, narrower and longer elytra, smaller and less produced eyes, slightly more curved aedeagus which has a slightly narrower apex and genital ring almost quadrangular.

*Redescription.* Measurements. Length: 8.8 mm; width: 3.2 mm. Ratios. Length eye/orbit: 2.5; length/width of 6th antennomere: 1.0; width/length of pronotum: 1.26; width of apex/width of base of pronotum: 0.82; widest diameter/width of base of pronotum: 1.20; length/width of elytra: 1.74.

Colour (Fig. 13). Upper and lower surfaces, including the mouth parts, uniformly chestnut brown, only the anterior part of the head and the mandibles slightly darker. Apex of palpi lighter. Antennae blackish, but basal antennomere dark reddish. Femora reddish; tibiae and tarsi rather contrastingly dark piceous to almost black.

Head (Fig. 10). Head of average size. Eye relatively large, laterally rather projecting. Orbit oblique and slightly convex, forming a weak angle with the neck. Clypeal suture distinct; clypeus anteriorly very slightly concave; labrum anteriorly moderately concave. Mandibles comparatively short, inner surface in basal half parallel-sided, towards apex markedly incurved. Mentum bisetose, with feeble tooth. Submentum bisetose, setae elongate. Glossa elongate, with two elongate setae; paraglossae hyaline, narrow, far surpassing the glossa. Lacinia with two moderately dense rows of setae. Both palpi narrow and elongate, impilose, obtuse at apex. Antennae very short, median antennomeres about as long as wide; 1st-3rd antennomeres glabrous, other antennomeres densely pilose; from 5th antennomere lateral surfaces with even denser pilosity and glandular fields. Frons and clypeus very slightly convex in middle; clypeal suture deep; frontal sulci moderately deep, oblique, slightly curved laterad. Inner margin of eye with a narrow sulcus. Neck sulcus barely impressed. Posterior supraorbital seta inserted just at posterior margin of eye. Surface glossy, with very fine, extremely superficial

microreticulation, only visible at very high magnification. Only labrum with fine, isodiametric microreticulation.

Pronotum (Fig. 10). Barely cordiform, rather wide, base wider than apex, widest point slightly behind apical third. Apex with shallow excision, apical angles slightly produced, widely rounded. Lateral margins at anterior two thirds evenly convex, then almost straight, near base very slightly sinuate. Basal angles almost right, barely produced laterad, base in middle straight, laterally slightly oblique. Dorsal surface rather depressed. Apex not margined, lateral border rather narrowly margined, margin slightly upturned; lateral sulcus narrow and rather shallow, slightly widened towards base; base distinctly margined. Median line shallow, not reaching apex or base. Anterior transverse sulcus barely perceptible; posterior sulcus distinct though shallow. Basal grooves deep and wide, at bottom with two inconspicuous, short, straight impressions. Anterior marginal seta situated slightly behind apical third, slightly removed from margin; posterior marginal seta situated slightly in front of basal angle. Surface almost devoid of transverse impressions, with extremely fine, sparse punctures and here and there with traces of highly superficial, fine microreticulation consisting of transverse lines. Both punctures and microreticulation perceptible only at very high magnification; surface very glossy.

Elytra (Fig. 13). Rather elongate, parallel-sided, dorsally convex though disk depressed. Humeral angle obtusely angulate. Lateral margin straight, apical curvature very slightly sinuate. Scutellary stria elongate, in 1st interval. Six median striae complete and impressed throughout, distinctly punctate-crenulate; 7th stria in anterior half not impressed, finely punctate throughout. Six median intervals very gently convex, lateral intervals depressed. Subapical carina distinct. Scutellary pore and seta situated at base of 1st stria. 3rd interval with a single setiferous puncture slightly in front of apical third, adjacent to 3rd stria. Marginal series consisting of 13-14 punctures and setae, widely interrupted in middle; punctures small, setae of very different length. At apex with an elongate seta situated inside of the subapical carina, and with a smaller one at end of 2nd stria. Intervals not perceptibly punctate, with traces of extremely fine and highly superficial microreticulation that consists of transverse lines, only visible at very high magnification.

Lower surface. Impunctate and impilose, with extremely fine and very superficial microreticulation only visible at very high magnification. Metepisternum narrow and elongate, slightly  $> 2 \times$  as long as wide at apex. Terminal abdominal sternum in male quadrisetose.

Legs. Moderately slender and elongate. Profemur unarmed on lower surface. Protibia slightly curved, sulcate at anterior surface. Mesotibia almost straight. Tarsi narrow and comparatively short, dorso-ventrally depressed; 5th tarsomeres with one pair of setae at lower surface. Tarsal claws elongate, glabrous.



Male genitalia (Fig. 4). Genital ring large, irregularly quadrate, laterally slightly convex, with wide, almost transverse apex. Aedeagus rather narrow, laterally compressed, markedly widened in middle, convexly narrowed towards apex; lower surface concave throughout, with a distinct ridge in basal half. Apex short and narrow, shortly triangular at tip. Orifice rather short, situated on upper right side. Internal sac with several elongate, moderately sclerotized folds. Both parameres comparatively short and stout, with rather short apices. The very apex of both parameres with two or three extremely short setae visible only under very high magnification.

Female genitalia. Unknown.

Variation. Unknown.

*Etymology.* The Latin word '*regalis*' means 'belonging to the king' and refers to the type locality of the species, Royal National Park.

*Distribution.* Royal National Park immediately south of Sydney, southeastern New South Wales. Known only from the type locality.

*Collecting circumstances.* The holotype was collected by pyrethrin fogging of the broken, partly decayed trunk of a newly-fallen eucalypt tree at the interface of rainforest and eucalypt forest. The parts of the tree sprayed were 1-2 metres above the ground. The break exposed internal cavities in the log and the specimen might have come from these. Several *Phoracantha* longicorn beetles came from the same situation, indicating that there might have been larval prey available for the carabid.

### Measurements and ratios of the species of *Moriodesma*

For abbreviations see under *Melisodera*.

Species	N	Body length	l eye/ orbit	l/w 6 <sup>th</sup> ant	w/l pron	Apex/ base pron	Dia/base pron	l/w elytra
<i>M. mcoyei</i>	7	8.7- 9.9	2.9- 3.0	1.0	1.31- 1.36	0.82- 0.84	1.22- 1.25	1.66- 1.69
<i>M. regalis</i>	1	8.8	12.5	1.0	1.26	0.82	1.20	1.74

### Key to the species of the genus *Moriodesma* Castelnau

- 1 Prothorax wider, ratio width/length > 1.30; elytra shorter and wider, ratio length/width < 1.70; eye larger and laterally more produced, orbit shorter and more oblique (Fig. 9); aedeagus slightly less concave on the ventral surface, with wider apex, genital ring triangular (Fig. 3). e. VIC, e. NSW, ACT, se. QLD ..... *mcoyei* Castelnau, 1867
- Prothorax narrower, ratio width/length 1.26; elytra longer and narrower, ratio length/width 1.74; eye smaller and laterally less produced, orbit longer and less oblique (Fig. 10); aedeagus slightly more concave on the ventral surface, with narrower apex, genital ring almost quadrangular (Fig. 4). Royal National Park, se. NSW ..... *regalis* sp. n.

## Discussion

The psydrine subtribe *Melisoderina* was previously known only from the southeastern mainland of Australia, north to Armidale (30°30'S) in northern New South Wales (Moore *et al* 1987). The records in the present paper of *Rhaebolestes lamingtonensis* and *Moriadema mcoyei* from Lamington National Park confirm the occurrence of the subtribe another 270 km further north, into the southern corner of Queensland at 28°03'S. Elsewhere (Baehr in press), I record the genus *Moriomorpha* another 1200 km further north into the tropics of Queensland at about 19°00'S. Specimens of all genera are rare or very rare in collections.

The hitherto monospecific genera *Melisodera* and *Rhaebolestes* now exhibit similar distribution patterns, each with one southern and one northern species separated by a quite wide distributional gap, at least at present knowledge. However, the present paper shows that our knowledge of diversity and distribution of melisoderine species is quite fragmentary; some of the additional species are from areas quite outside the putative ranges of the respective genera but all these new species are known from single specimens. This suggests that these melisoderines are either actually rare in nature or they have secretive habitats which render their collection difficult. But it also shows that we have far from an exhaustive knowledge of their species diversity and distribution and that more species may be detected and the ranges of the known species may be extended in future.

Very little is known about ecology and ethology of any melisoderine species. Published information and communications from Geoff Monteith (Brisbane) suggests that some species live inside hollow logs and dead trees, where they probably feed on larvae of various wood-inhabiting beetles (Moore 1964, Monteith in litt., Sloane 1903, Baehr in press). In the southern part of the subtribe's range, most species have been collected in sclerophyll forest rather than in rainforest. But in the subtropics and tropics, the few records are from subtropical and tropical montane rainforest.

The record of *Moriadema mcoyei* at light demonstrates that this species flies deliberately and this could explain its wide range, which extends from southern Victoria along the whole southeast coast of Australia to southeastern Queensland.

The mode of life mentioned probably accounts for the rarity of specimens in collections and the apparent rarity of most species is a good reason for intensified collecting and study of habits and life histories of the melisoderines. However, even more important, in my view, is that the non-arboricolous Psydrini are critical for phylogenetic studies, because this tribe holds a position at a crucial node in the phylogenetic tree of the Carabidae and probably gave rise to most of the more evolved carabid groups. So further exploration, which primarily means sampling, of this most interesting group of carabid beetles is an important task.



## Acknowledgements

I am much indebted to C. Lemann and T. Weir, Australian National Insect Collection, Canberra, for the loan of specimens and types and for their kind assistance during my recent visit at that institution, to G. Monteith, Queensland Museum, Brisbane, for the loan of the specimens of *Moriadema regalis* and *Rhaebolestes lamingtonensis* and for linguistic revision of this paper, and to R. Poggi, Genoa, for the loan of types from the Castelnau Collection. To the Deutsche Forschungsgemeinschaft (DFG) I am indebted for supporting the visit to ANIC by the grant No. BA 856/11-1.

## References

- BAEHR, M. 1999. A preliminary survey of the classification of the Psyrinae (Coleoptera: Carabidae). In: Ball, G.E., Casale, A. and Vigna Taglianti, A. (eds), Phylogeny and classification of Caraboidea. *Museo regionale di Scienze naturali di Torino* 1998: 359-368.
- BAEHR, M. 2003. Psyrine ground beetles (Coleoptera: Carabidae: Psyrinae) excluding Amblytelini, of eastern Queensland rainforests. *Memoirs of the Queensland Museum* 49: 65-109.
- BAEHR, M. 2005. The Amblytelini. A tribe of corticolous ground beetles from Australia. Taxonomy, phylogeny, biogeography (Insecta, Coleoptera, Carabidae, Psyrinae). *Coleoptera* 8: 1-286.
- BAEHR, M. in press. New species and new records of the genus *Moriomorpha* Castelnau from Australia (Coleoptera: Carabidae: Psyrini: Melisoderina). *Spixiana*.
- CASTELNAU, F.L. de. 1867. *Notes on Australian Coleoptera*. Royal Society of Victoria; 139 pp.
- CASTELNAU, F.L. de. 1868. Notes on Australian Coleoptera. *Transactions of the Royal Society of Victoria* 8: 95-225.
- CSIKI, E. 1929. *Coleopterorum Catalogus. Carabidae: Harpalinae III*. 1(104): 347-528. De Gruyter, Berlin.
- LORENZ, W. 1998. Systematic list of extant ground beetles of the World (Insecta Coleoptera "Geadephaga": Trachypachidae and Carabidae incl. Paussinae, Cicindelinae, Rhysodidae). Tutzing; printed by the author; 502 pp.
- LORENZ, W. 2005. Systematic list of extant ground beetles of the World (Insecta Coleoptera "Geadephaga": Trachypachidae and Carabidae incl. Paussinae, Cicindelinae, Rhysodidae). 2nd ed. Tutzing; printed by the author; 530 pp.
- MOORE, B.P. 1963. Studies on Australian Carabidae (Coleoptera) 3. - The Psyrinae. *Transactions of the Royal Entomological Society of London* 115: 277-290.
- MOORE, B.P. 1964. Australian larval Carabidae of the subfamilies Broscinae, Psyrinae and Pseudomorphinae (Coleoptera). *Pacific Insects* 6: 242-246.
- MOORE, B.P., WEIR, T.A. and PYKE, J.E. 1987. Rhysodidae and Carabidae. In: *Zoological Catalogue of Australia* 4: 17-320. Australian Government Publication Service, Canberra.
- SLOANE, T.G. 1903. Studies in Australian Entomology. No XII. New Carabidae (Panagaeini, Bembidiini, Pogonini, Platysmatini, Platynini, Lebiini, with revisional lists of genera and species [sic], some notes on synonymy, etc.). *Proceedings of the Linnean Society of New South Wales* 28: 566-642.
- WESTWOOD, J.O. 1835. De genere *Ozaena* et affinitatibus suis. *Magazine of Zoology* 5: No. 132.



## ENTOMOLOGICAL NOTICES

Items for insertion should be sent to the editor who reserves the right to alter, reject or charge for notices.

## NOTES FOR AUTHORS

Manuscripts submitted for publication can be submitted as either hardcopies or electronically. Three copies (double spaced text and illustrations) of hardcopy manuscripts should be submitted. Manuscripts submitted in digital format should be sent in Microsoft Word. Digital illustrations should be sent initially as low resolution images in a separate Word file, as low resolution JPEGs, or as low resolution PDF files, with figure numbers indicated clearly for each figure. High resolution TIFFS or JPEGS (300 dpi at print size) must be provided at the time of acceptance of the manuscript. Digital manuscripts may be sent via email to [federica.turco@qm.qld.gov.au](mailto:federica.turco@qm.qld.gov.au) Hardcopy manuscripts and digital manuscripts on disc should be sent to:

The Editorial Co-ordinator  
The Australian Entomologist  
P.O. Box 537,  
Indooroopilly, Qld, 4068

Authors should refer to recent issues for layout and style. All papers will be forwarded to two referees and the editor reserves the right to reject any paper considered unsuitable.

It is editorial policy that usage of taxonomic nomenclature will comply with the mandatory provisions of the International Code of Zoological Nomenclature.

Papers longer than twenty printed pages will not normally be accepted.

Publication costs are \$25 per page. This covers unlimited use of colour which is encouraged. These costs include the supply of a pdf copy of the paper and 10 hardcopy reprints to the senior author. Papers occupying one printed page or less may be accepted without charge if no reprints are required. Reprints may be supplied for one page papers at the normal cost, by arrangement. Page charges may be reduced at the discretion of the Publications Committee. An application for reduction must be made, with reasons, at the time of acceptance of the manuscript.

Further information for authors is given on the ESQ website at <http://www.esq.org.au/Authors%20guide%201.html>



THE AUSTRALIAN  
**Entomologist**

Volume 38, Part 3, 5 September 2011



CONTENTS

---

BAEHR, M.

New species of the genera *Melisodera* Westwood, *Rhaebolestes*  
Sloane and *Moriademia* Castelnau from Australia  
(Coleoptera: Carabidae: Psyrini)

129

---

HANCOCK, D. L.

An annotated key to the species of *Acanthonevra* Macquart  
and allied genera (Diptera: Tephritidae: Acanthonevrini).

74

---

ORR, A.G. and FLIEDNER, H.

Notes on the correct spelling of species-group names of  
Australian butterflies (Lepidoptera).

101

---

WEIR, R.P., MEYER, C.E. and BROWN, S.S.

Notes on the biology of *Ogyris zosine* (Hewitson, 1853)  
(Lepidoptera: Lycaenidae: Theclinae), including the first  
record of the purple female form from the Northern Territory.

97

---